PART 1

Worksheets

Unit 1 The Lesson

25

Test yourself 1

Answer each of the following questions :

1 Complete the following statements : *(5 marks)*

1. ..... is a device that is used to measure the mass of an object, while ..... is a device that is used to measure its weight.
2. The gravitational force by which a body is attracted to the Earth is known as ..... and it increases by increasing the ..... of the body.
3. As the mass of a planet increases, the ..... of planet increases and the ..... of the object exists on it increases.
4. The measuring units of mass are ..... and ....., while the measuring unit of weight is .....
5. The weight of an object on the moon's surface is equal to ..... of its weight on the Earth's surface.

---

2 [A] Give reasons for : *(5 marks)*

1. The weight of an object differs according to the planet on which the object exists.

.....

.....

2. The balance scale must be placed horizontally on a stable shelf.

.....

.....

3. The weight of a person in a balloon differs from its weight on the Earth's surface.

.....

.....

[B] Put (✓) or (✗) :

1. The mass of one liter of distilled water equals one kilogram. ( )
2. The mass of an object is measured in Newton that equals 1000 grams. ( )
3. One-arm digital scale is used to measure the weight of objects. ( )
4. The mass of a body changes according to its place. ( )

Test yourself

3 **[A] Complete the following table :** *(5 marks)*

Mass of a body on the Earth's surface	30 kg.	..... kg.	..... gm
Weight of a body on the Earth's surface	.... Newton	10 Newton	30 Newton

[B] Write the scientific term :

1. A device used to measure the mass of small objects as gold and chemicals. (.....)
2. The measuring unit of mass that equals the mass of one liter of distilled water. (.....)

---

4 **[A] What is meant by ... ?** *(5 marks)*

1. Weight :

.....

.....

2. Mass :

.....

.....

[B] Choose the correct answer :

1. By increasing the distance between an object and the Earth's surface, so the weight of this object .....

a. decreases. b. increases. c. is not affected. d. (a) and (b).

2. All the following scales can be used to determine the mass of an object except .....

a. sensitive balance. b. balance scale.

c. digital scale. d. spring scale.

3. Weight (Newton) = Mass (kg.) × .....

a. 1 b. 10 c. 100 d. 1000

1 Part

5 [A] Choose from column (B) what suits it in column (A) : *(5 marks)*

(A)	(B)
1. Gram	a. the measuring unit of weight.
2. Kilogram	b. the measuring unit of big masses.
3. Newton	c. always affects towards the center of Earth.
4. Weight	d. the measuring unit of small masses.

1. ..... 2. ..... 3. ..... 4. .....

[B] If the mass of an object on the Earth's surface equals 60 kg.

Calculate the following :

1. Its mass on the moon's surface.

.....

2. Its weight on the Earth's surface.

.....

.....

3. Its weight on the moon's surface.

.....

.....

General Exercises of the School Book on Unit 1

1 Choose the correct answer :

1. The device of measuring weight is .....

a. one-arm scale. b. two-arms scale. c. digital scale. d. spring scale.

2. An object whose weight is 20 Newton on Earth, its mass is equal to .....

a. 10 kg. b. 2 kg. c. 200 kg. d. 20 kg.

2 Complete the following statements :

1. Mass is measured by ....., whereas weight is measured by .....
2. Mass is the amount of matter that body contains. It does not change according to .....
3. An object's weight depends on ..... , ... and .....

3 Fill in the following table :

Points of comparison	Mass	Weight
Definition :	....	....
Unit of measurement :	.....	.....
Device of measurement :	.....	.....
Direction :	.....	.....
Effect of different places :	.....	.....

4 If an object's mass = 30 kg. on Earth, calculate :

1. Its mass on the moon.

.....

2. Its weight on the Earth.

.....

.....

3. Its weight on the moon.

.....

.....

Model Exam 1 on Unit 1

25

Answer the following questions :

1 Complete the following statements : *(5 marks)*

1. Mass is measured in gram. It is equal to the mass of ..... and suitable for measuring ..... masses such as .....
2. The mass of any matter is ..... value and it is not affected by changing .....
3. ..... is the measuring unit of weight which is almost equal to the weight of an object on ..... surface whose mass is ..... gram.
4. Weight of any object = ... × 10.
5. The weight of any object can be measured by using the .....

2 [A] Choose the correct answer : *(5 marks)*

1. The weight of any object ..... when the distance between the body and the center of Earth increases.
   a. decreases b. increases c. doesn't change d. (a) and (b)
2. The object's mass is 2 kg, so its weight on Earth is equal to .....
   a. 2 Newton. b. 20 Newton. c. 200 Newton. d. 0.2 Newton.
3. The weight of a person in a flying balloon is ..... that on the Earth's surface.
   a. smaller than b. larger than c. equal to d. (a) and (b)
4. 5000 gram is equal to .....
   a. 50 kg. b. 500 kg. c. 5 kg. d. 0.5 kg.

[B] What is meant by ... ?

1. The weight of a person is equal to 700 Newton.

   .....

2. The mass of one small watermelon is 2 kilogram.

   .....

3 [A] Put (✓) or (✗) : *(5 marks)*

1. Spring scale is used to measure the mass of objects. ( )
2. The weight of an object on the Earth's surface equals 6 times of its weight on the moon's surface. ( )

3. The balance scale is used to measure large weight as cheese and vegetables. ( )
4. Sensitive scale is used to measure small masses as gold and chemicals. ( )

[B] Compare between :

Points of comparison	Mass	Weight
Measuring devices :	.....	.....
The effect of changing the place :	.....	.....

4 [A] Write the scientific term : *(5 marks)*

1. The measuring unit of mass. (.....)
2. The measuring unit of weight. (.....)

[B] Look at the opposite figure, then answer the questions :

1. What is the name of each figure ?
   fig. (a) ..... fig. (b) .....
2. What is the importance of fig : (b) ?
   .....
   .....
   .....

Fig. (a)

Fig. (b)

5 [A] Give reasons for : *(5 marks)*

1. The weight of a person on the Earth's surface is larger than that on the moon's surface.
   .....
2. The mass of a body on the Earth's surface is equal to the mass of the same body on the moon's surface.
   .....

[B] If the weight of an object on the moon's surface equals 8 Newton, calculate :

1. The weight of the object on the Earth's surface.
   .....
2. The mass of the object on the Earth's surface.
   .....

Model Exam 2 on Unit 1

25

Answer the following questions :

1 Choose the correct answer : *(5 marks)*

1. ..... can be used to determine the mass of an object.

a. Balance scale b. Sensitive scale c. Digital scale d. (a) , (b) and (c)

2. 1 Newton = ... × 10

a. 1 kg. b. 0.1 kg. c. 0.1 gm. d. 0.01 kg.

3. The Earth gravitational force ..... , as the distance between an object and the center of the Earth increases.

a. decreases b. increases c. doesn't change d. no correct answer

4. The object's weight on the moon = It weight on the Earth ÷ .....

a. 6 b. 0.6 c. 16 d. 61

5. If the mass of your body is equal to 36 kg. on the Earth's surface, so your mass on the moon surface is .....

a. 6 Newton. b. 360 Newton. c. 36 kg. d. 360 kg.

---

2 [A] Give reasons for the following : *(5 marks)*

1. The gravitational force of the Earth is more than that of the moon.

.....

.....

2. The wire of a spring scale expands when a body is hanged to it.

.....

.....

[B] Correct the underlined words :

1. Newton is nearly equal the mass of one paper clip. (.....)
2. The weight of an object doesn't change according to the planet that the object exists on. (.....)
3. The mass of your body on the Earth is more than that on the moon. (.....)
4. The weight of objects is measured in kilogram. (.....)

Test yourself

3 [A] Write the scientific term : *(5 marks)*

1. The amount of matter in an object. (.....)
2. The force by which a body is attracted to the Earth. (.....)

[B] Write down the factors that affect the weight of an object :

1. .....
2. .....
3. .....

4 [A] What happens if ... ? *(5 marks)*

1. You travel from the Earth's surface to the moon's surface. (according to your weight).

   .....

   .....

2. There is no gravity on the Earth's surface.

   .....

   .....

[B] Write the name of the device that is used to measure the following :

1. The mass of vegetables and fruits. (.....)
2. The weight of your school bag. (.....)
3. The mass of a golden ring. (.....)

5 If you know that the weight of an object on the Earth's surface is 480 Newton. Calculate : *(5 marks)*

1. Its mass on the Earth's surface.

   .....

2. Its mass on the moon's surface.

   .....

3. Its weight on the moon's surface.

   .....

   .....

Unit 2 Lesson 1

25

Test yourself 2

Answer each of the following questions :

1 Complete the following sentences : *(5 marks)*

1. Temperature is the degree of ..... or ..... of a body.
2. Wood is ..... conductor of heat, while aluminium is ..... conductor of heat.
3. All ..... such as iron and copper are ..... conductors of heat.
4. Handles of cooking pots are made of heat ..... materials such as plastic and .....
5. Heat is a form of ..... and can be measured by using .....

---

2 [A] Give reasons for : *(5 marks)*

1. Copper is considered as a good conductor of heat, while wood is considered as a bad conductor of heat.

.....

.....

2. Cooking pots are made of aluminium.

.....

.....

3. Wearing heavy woolen clothes in winter.

.....

.....

[B] Put (✓) or (✗) , then correct the underlined word :

1. Metals are **equal** in conducting heat. ( )

.....

2. Heat always transfers from the **cold object to hot object**. ( )

.....

Test yourself

3 Compare between : *(5 marks)*

Points of comparison	Heat conductors	Heat insulators
1. Definition :	....	....
2. Examples :	..... and	..... and .....
3. One use :	.....	.....

4 [A] What is meant by ... ? *(5 marks)*

1. Heat energy :

.....

.....

2. Temperature :

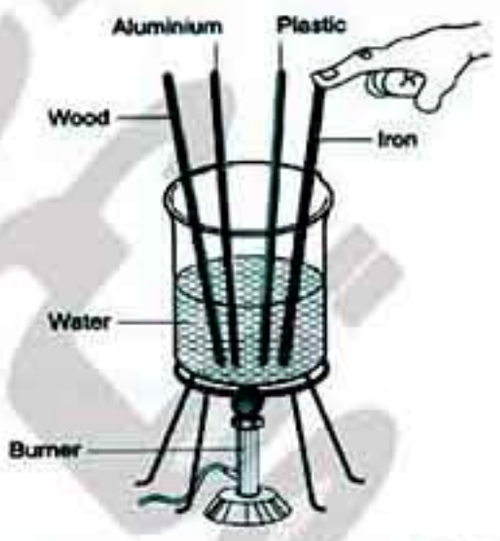
.....

.....

[B] Write the scientific term :

1. Materials that allow heat to flow through. (.....)
2. The fastest metal in conducting heat. (.....)
3. Materials that don't let heat flow through. (.....)

5 [A] The opposite figure shows an activity you have studied. Write your observations and conclusion. *(5 marks)*



- **Observations :**
  1. .....
  2. .....
- **Conclusion :**

.....

[B] Classify the following materials into heat conductors and heat insulators :

(Iron - Plastic - Air - Copper - Aluminium - Wood - Stainless steel - Water)

Heat conductors	Heat insulators
....	....

Unit 2 Lesson 2

25

Test yourself 3

Answer each of the following questions :

1 Complete the following sentences : *(5 marks)*

1. The main idea of thermometer is the change in the ..... of the liquid inside it according to the change of .....
2. ..... is used in measuring the temperature of different liquids, whereas ..... is used in measuring the temperature of the human body.
3. In Celsius thermometer, the lower fixed point is ..... degree, while the upper fixed point is ..... degree.
4. In medical thermometer, each degree is divided into ..... parts, where each part equals ..... degree.
5. Liquids expand by ..... and contract by .....

---

2 [A] Give reasons for : *(5 marks)*

1. Mercury is used in the manufacture of thermometers.

.....

.....

.....

2. The presence of a constriction in the medical thermometer.

.....

.....

3. Thermometers must be kept out the reach of children.

.....

[B] Put (✓) or (✗) :

1. Mercury is a good conductor of heat. ( )
2. The capillary tube inside the thermometer is closed at one of its ends, while the other end is connected to the mercury bulb. ( )
3. The scale of the medical thermometer starts with 35°C to 42°C. ( )
4. Ethyl alcohol is the liquid that is used in the manufacture of medical thermometer. ( )

Test yourself

3 [A] What happens if ... ? *(5 marks)*

1. The medical thermometer is placed in a cup of boiled water.
   .....
   .....
2. You seize the medical thermometer firmly with your teeth.
   .....
   .....

[B] Choose the correct answer :

1. The ..... thermometer contains a constriction.
   a. Celsius b. medical
   c. (a) and (b) d. no correct answer
2. Types of thermometers include .....
   a. medical thermometer. b. Celsius thermometer.
   c. spring scale. d. (a) and (b).
3. Before using the medical thermometer, we must .....
   a. shake it. b. sterilize it.
   c. (a) and (b). d. no correct answer.

4 Write the scientific term : *(5 marks)*

1. A device used to measure the temperature. (.....)
2. A small structure in the medical thermometer that prevents mercury to return back to the mercury bulb. (.....)
3. A liquid that is used in sterilizing the medical thermometer. (.....)
4. A device that is used to measure the temperature of iced water. (.....)
5. The boiling point of water. (.....)

5 Look at the following figures , then answer the following questions : *(5 marks)*

1. Label the figures :
   ① ..... ② .....
   ③ ..... ④ .....
2. Figure (a) represents the ..... which is used to measure .....
3. Figure (b) represents the ..... which is used to measure .....
4. What is the importance of part number ① ?
   .....

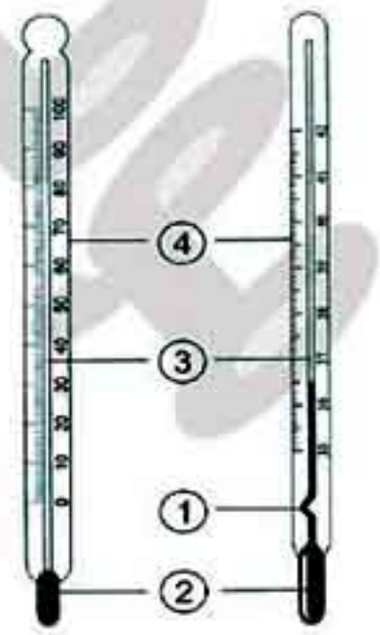


fig. (a) fig. (b)

General Exercises of the School Book on Unit 2

1 Complete the following statements :

1. We measure temperature by using .....
2. ..... is used in measuring temperatures of different liquids, whereas ..... is used in measuring the temperature of the human body.
3. ..... , ... and ..... are good conductors of heat.
4. ..... , ... and ..... are bad conductors of heat.

2 Write the scientific term for each of the following statements :

1. A device used to measure temperature. (.....)
2. The materials that allow the flow of heat inside. (.....)
3. The materials that do not allow the flow of heat inside. (.....)

3 Write the most important uses of the good and bad conductors of heat.

.....

.....

.....

.....

4 Fill in the spaces of the following tables :

1.

Points of comparison	Celsius thermometer	Medical thermometer
Structure :	....	
Scale :	.....	.....
Used liquid :	.....	.....
Usage :	....	....

Test yourself

2.

Points of comparison	Good conductors of heat	Bad conductors of heat
Definition :	....	....
Examples :	....	....
Usage :	....	....

5 Put (✓) in front of the correct statements and (✗) in front of the false one and correct the false ones :

1. Medical thermometer is used in measuring the temperatures of different liquids. ( )
.....
2. The scale of the Celsius thermometer starts from 35°C to 42°C ( )
.....
3. Aluminium is a bad conductor of heat. ( )
.....
4. Wood is a good conductor of heat. ( )
.....

6 Write an explanation for each of the following :

1. Mercury is used in thermometers.
.....
.....
.....
2. The handles of cooking utensils are made of wood or plastics.
.....
3. Cooking utensils are made of stainless steel or aluminium.
.....
4. There is a constriction in the medical thermometer.
.....
.....

Model Exam 1 on Unit 2

25

Answer the following questions :

1 Complete the following statements : *(5 marks)*

1. Leaving spaces between railway bars which are made of ..... to avoid train accident as ..... is considered ..... heat conductor.
2. Handles of cooking pots and electric iron are made of ..... or .....
3. ..... conducts heat faster than aluminium and iron.
4. The main idea of thermometer action is changing the ..... of liquid inside as the ..... changes.
5. Mercury is used in making thermometers because it is a ..... metal and ..... conductor of heat.

---

2 [A] Give reasons for : *(5 marks)*

1. All metals are good conductors of heat.

.....

2. Mercury is used in the manufacture of thermometer.

.....

.....

3. The presence of a constriction in the medical thermometer.

.....

[B] Put (✓) or (✗) :

1. Aluminium conducts heat slower than copper. ( )
2. Different metals transfer heat by the same rate. ( )

---

3 [A] Choose the correct answer : *(5 marks)*

1. Heat transfers from .....
   a. a glass of hot tea to a glass of ice.
   b. a glass of ice to a glass of hot tea.
   c. a glass of hot tea to another glass of tea that has the same temperature.
   d. all the previous answers.
2. Aluminium conducts heat faster than .....
   a. copper. b. iron. c. (a) and (b) d. no correct answer.
3. The normal temperature of the healthy person is .....
   a. 36.4°C b. 38°C c. 37°C d. 40°C

Test yourself

4. The medical thermometer is placed ..... tongue to measure temperature.
   a. above b. under c. beside d. (a) and (b)
5. The scale of Celsius thermometer ranges between .....
   a. zero°C to 10°C b. zero°C to 100°C
   c. zero°C to 50°C d. 37°C to 42°C

[B] Look at the opposite figures and then answer the questions :

1. What is the name of fig. (a) and fig. (b) ?

.....

.....

2. What are the uses of fig. (a) and (b) ?

.....

.....

.....

.....

fig. (a) fig. (b)

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4 [A] Give the scientific term : *(5 marks)*

1. A liquid metal that is used in making thermometer. (.....)
2. A type of thermometers that its scale ranges from 0°C to 100°C. (.....)
3. A material that is used in making heavy blankets. (.....)

[B] What is meant by ... ?

1. Heat conductors.

.....

2. Heat energy.

.....

---

5 [A] What happens if ... ? *(5 marks)*

1. The handles of cooking pots are made of aluminium.

.....

2. There is no constriction in the medical thermometer.

.....

3. A medical thermometer is put in boiled water.

.....

[B] What is the main idea of making thermometers ?

.....

Model Exam 2 on Unit 2

25

Answer the following questions :

1 Choose the correct answer : *(5 marks)*

1. ..... is the liquid that is used in making thermometers.
   a. Water b. Mercury c. Alcohol d. Oil
2. ..... conduct(s) heat faster than iron.
   a. Copper b. Aluminium c. Wood d. (a) and (b)
3. All the following are heat insulators except .....
   a. air. b. wool. c. stainless steel. d. plastic.
4. ..... is used to sterilize the medical thermometer before using.
   a. Mercury b. Ethyl alcohol c. Boiled water d. Cold water
5. You feel hot when you touch a cup of tea, because the temperature of the cup is ..... that of your hand.
   a. more than b. less than c. equal to d. (a), (b) and (c)

---

2 [A] Give reasons for the following : *(5 marks)*

1. Medical thermometer must be shaked before using.
   .....
2. You feel cold when touching a piece of ice.
   .....
   .....
3. Boiling water is not used to sterilize the medical thermometer.
   .....
   .....

[B] Put (✓) or (✗)

1. The volume of liquids change by changing the temperature. ( )
2. Handles of cooking pots are made of heat conducting materials. ( )
3. Air is used in making the insulating glass windows. ( )
4. Mercury is a regular expanding material. ( )

---

3 Complete the following sentences : *(5 marks)*

1. The degree of ..... or ..... of an object is known as temperature.

Test yourself

2. The melting point of ice is ..... °C, while the boiling point of water is ..... °C
3. Cooking utensils are made up of ..... or .....
4. In the ..... thermometer, there is a ..... above the mercury bulb.
5. Mercury remains in liquid state between ..... °C and ..... °C

4 [A] What happens if ... ? *(5 marks)*

1. Two bodies have the same temperature touch each other.

.....

.....

2. The medical thermometer doesn't have a constriction.

.....

.....

[B] Choose from column (B) what suits it in column (A) :

(A)	(B)
1. Celsius thermometer.	a. Its scale is from 35°C to 42°C.
2. Heat energy.	b. is 37°C.
3. Medical thermometer.	c. transfers from hot body to cold body.
4. The normal human body temperature.	d. Its scale is from 0°C to 100°C.

1. ..... 2. ..... 3. ..... 4. .....

5 [A] Write one function of each of the following : *(5 marks)*

1. Wood and plastic :

.....

2. Medical thermometer :

.....

3. Celsius thermometer :

.....

[B] Why mercury is used in making thermometers. (2 points only)

1. .....
2. .....

Unit 3 Lesson 1

25

Test yourself 4

Answer each of the following questions :

1 Write the scientific term : *(5 marks)*

1. A mixture of gases surrounding the Earth. (.....)
2. The chemical substance that acts as a catalyst in the preparation of oxygen gas in laboratory. (.....)
3. The way that is used to collect oxygen gas in laboratory. (.....)
4. The process by which plants take carbon dioxide gas and produce oxygen gas. (.....)
5. A chemical substance that remains without any change during the chemical reaction. (.....)

2 Complete the following statements : *(5 marks)*

1. ..... gas and other gases represent 1 % of the air volume, while ..... gas represents 78 %
2. ..... gas is consumed in respiration and ..... processes.
3. ..... gas is prepared in laboratory by the decomposition of ..... in the presence of manganese dioxide.
4. In photosynthesis process, the plant takes ....., water, sunlight and mineral salts to produce ..... and .....
5. Oxygen represents ..... of the air volume.

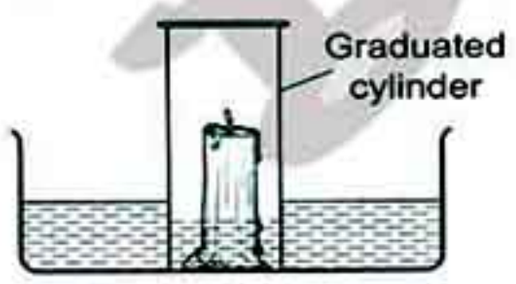
3 Ramy makes this activity to know the percentage of oxygen gas in air. *(5 marks)*

1. Ramy notice from this activity that water rises up in the cylinder with ..... of its volume.
2. What does he conclude from this activity ?

.....

3. Why does the water level rise up to this level ?

.....



Test yourself

4 [A] Give reasons for : *(5 marks)*

1. Oxygen is collected by downward displacement of water.

.....

2. Smoke and dust particles are air pollutants, but they are important in formation of snow and rains.

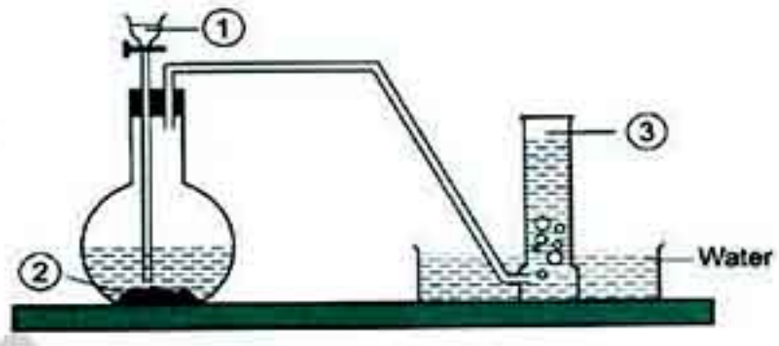
.....

3. Manganese dioxide is considered as a catalyst during the preparation of oxygen.

.....

[B] 1. Look at the opposite figure, then answer :

The opposite apparatus is used in preparation of .....



2. Label the figure :

① .....

② .....

③ .....

5 [A] Choose the correct answer : *(5 marks)*

1. All the following statements concerning the atmosphere except .....
   a. it adjusts the temperature of the Earth's surface.
   b. it consists of oxygen and nitrogen only.
   c. it protects the Earth from ultraviolet radiation coming from outer space.
   d. it is attracted to the Earth by gravity.
2. The percentage of oxygen gas equals ..... of the air volume.
   a. $\frac{1}{2}$ b. $\frac{1}{5}$ c. $\frac{1}{4}$ d. $\frac{1}{8}$
3. Oxygen is prepared by the decomposition of .....
   a. hydrogen. b. nitrogen oxide.
   c. hydrogen peroxide. d. calcium carbonate.

[B] What happens if ... ?

- The percentage of oxygen gas in air increases more than 21%

.....

.....

Unit 3 Lesson 1

25

Test yourself 5

Answer each of the following questions :

1 Put (✓) or (✗) , then correct the wrong ones : *(5 marks)*

1. Air is heavier than oxygen, so it replaces oxygen. ( )

.....

2. The combination between oxygen and an element in the presence of water is oxidation process. ( )

.....

3. Oxygen gas doesn't burn and doesn't help in burning. ( )

.....

4. The mass of elements decreases after combination with oxygen. ( )

.....

5. Oxygen gas is compressed in cylinders to be used during diving and climbing mountains. ( )

.....

2 Complete the following statements : *(5 marks)*

1. The rapid combination between oxygen and an element is ....., while ..... is the slow combination between oxygen and an element.
2. Oxy-acetylene flame is used in ..... and ..... of metals.
3. Oxygen gas ..... dissolves in water, so it is prepared in laboratory by .....
4. Oxygen combines with (lighted) magnesium to form ..... which is white matter.
5. Ozone molecule is composed of ..... atoms, but oxygen molecule is composed of ..... atoms.
6. To avoid ....., we must isolate ironware by paints.

3 [A] Mention three properties of oxygen gas. *(5 marks)*

.....

.....

.....

Test yourself

[B] What happens when ... ?

1. Leaving iron cubes in moist air without painting for a long time.

.....

2. A burning fragment is inserted in a cylinder filled with oxygen.

.....

4 [A] Write the scientific term : *(5 marks)*

1. It is a slow combination between oxygen and an element in the presence of water. (.....)
2. A layer in the atmosphere that protects the Earth from harmful radiations coming from the Sun. (.....)
3. A substance that is composed of oxygen combines with hydrogen. (.....)

[B] Mention two uses of oxygen gas.

.....

.....

5 [A] Choose the correct answer : *(5 marks)*

1. Oxygen cylinders are used .....
   a. in mechanical ventilation. b. during diving.
   c. to protect the Earth from harmful radiation.
   d. (a) and (b).
2. Oxy-acetylene flame is obtained as a result of combination between .....
   a. oxygen with hydrogen. b. acetylene with hydrogen.
   c. acetylene and nitrogen. d. acetylene with oxygen.
3. Water molecule consists of .....
   a. one oxygen atom and one hydrogen atom.
   b. one hydrogen atom and two oxygen atoms.
   c. two oxygen atoms and two hydrogen atoms.
   d. one oxygen atom and two hydrogen atoms.

[B] Give reasons for :

1. Iron rusting has many problems.

.....

2. Climbers use oxygen cylinders during climbing mountains.

.....

Unit 3 Lesson 2

25

Test yourself 6

Answer each of the following questions :

1 Choose the correct answer : *(5 marks)*

1. All the following processes produce carbon dioxide gas except .....
   a. respiration process. b. combustion of coal.
   c. combustion of tobacco. d. photosynthesis process.
2. Carbon dioxide gas is produced from .....
   a. respiration of animals only. b. respiration of plants only.
   c. respiration of humans only. d. (a) , (b) and (c)
3. Carbon dioxide molecule consists of one carbon atom linked with .....
   a. one oxygen atom. b. two oxygen atoms.
   c. two nitrogen atoms. d. one hydrogen atom.
4. Preparation of carbon dioxide occurs by .....
   a. adding dilute hydrochloric acid to calcium oxide.
   b. adding dilute hydrochloric acid to calcium carbonate.
   c. adding hydrogen peroxide to manganese dioxide.
   d. (b) and (c).
5. Limewater is used to detect the presence of carbon dioxide gas in air due to formation of ..... which is insoluble in water.
   a. calcium carbonate b. calcium oxide
   c. nitrogen gas d. sodium hydroxide

2 [A] Give reason for each of the following : *(5 marks)*

1. Increasing the percentage of carbon dioxide gas in air.
   .....
   .....
2. Carbon dioxide gas is not collected by displacement of water.
   .....
   .....
3. Limewater is used to detect the presence of carbon dioxide gas.
   .....

[B] Look at the opposite figure , then answer :

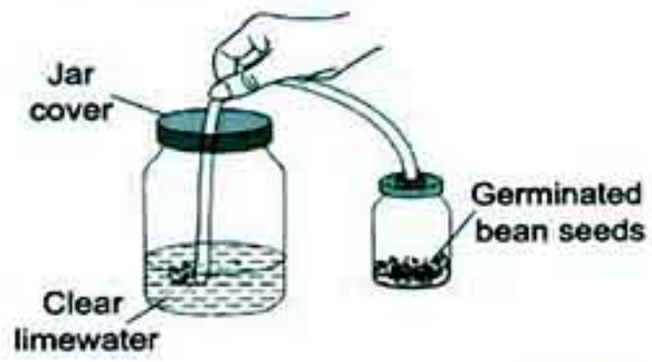
1. What happens for clear limewater in the jar ?

.....

.....

2. This activity proves that .....

.....



3 Complete the following statements : *(5 marks)*

1. By adding ..... to ..... we can prepare carbon dioxide gas.
2. Carbon dioxide is prepared by ..... displacement of air as it is ..... than air.
3. ..... and ..... are from the factors that increase the percentage of carbon dioxide gas.
4. Carbon dioxide molecule consists of ..... linked with two .....
5. Carbon dioxide is used in ..... process and produced from ..... process.

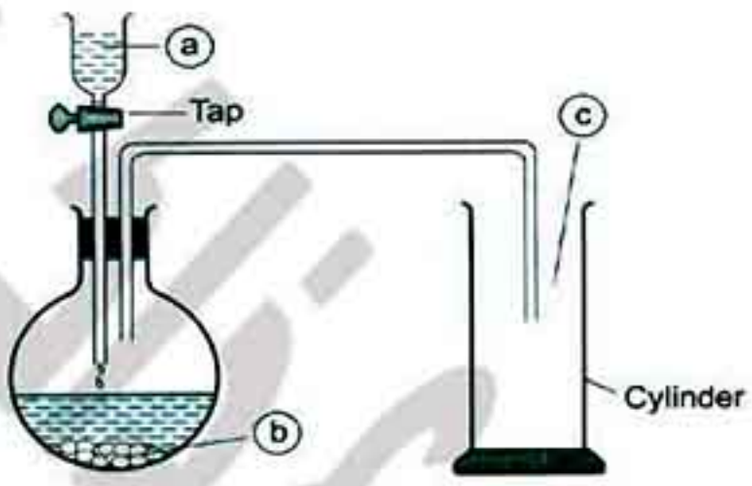
4 Look at the opposite figure , then answer : *(5 marks)*

1. This apparatus is used in preparation of .....
2. By adding liquid ⓐ to substance ⓑ , ... evolves.
3. Label the figure :

ⓐ .....

ⓑ .....

ⓒ .....



5 [A] Compare between oxygen gas and carbon dioxide gas according to preparation. *(5 marks)*

.....

.....

.....

[B] Put (✓) or (✗) and correct the wrong ones :

1. Decreasing the green areas causes increasing the ratio of carbon dioxide gas in air. ( )

.....

2. Carbon dioxide is necessary for humans to build their bodies. ( )

.....

Unit 3 Lesson 2

25

Test yourself 7

Answer each of the following questions :

1 [A] Give reasons for : *(5 marks)*

1. Adding yeast to dough.

.....

2. Carbon dioxide gas has many uses.

.....

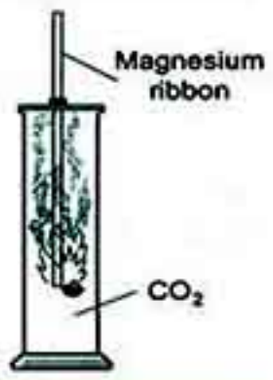
.....

3. Carbon dioxide gas is used in extinguishing fires.

.....

[B] Look at the opposite activity, then answer :

The combustion of magnesium ribbon in this activity produces ..... which is white powder and ..... which is a black substance.



2 [A] Choose the correct answer : *(5 marks)*

1. All the following are from the properties of carbon dioxide gas except .....
   a. it is heavier than air.
   b. it doesn't burn and doesn't help in burning.
   c. it easily dissolves in water.
   d. it scarcely soluble in water.
2. Which of the following is from the importance of carbon dioxide gas ? .....
   a. It is used in cutting and welding metals.
   b. It is used in diving.
   c. It is used in making soft drinks.
   d. It is used during climbing mountains.
3. When a glowing magnesium ribbon is inserted in a jar containing carbon dioxide gas , ... element deposits on the wall of the jar.
   a. carbon b. magnesium c. sodium d. chlorine

[B] What are the disadvantages of increasing carbon dioxide gas in air ?

1. .....
2. .....

Test yourself

3 Complete the following sentences : *(5 marks)*

1. Adding yeast to dough produces ..... gas during ..... process that expands by heat making bread porous and tasty.
2. Carbon dioxide gas is converted into ..... by pressure and cooling, but by relieving pressure, ... is produced.
3. Increasing the percentage of carbon dioxide gas causes ..... and also ..... phenomenon.
4. Carbon dioxide is necessary for plants to make ..... process and necessary for baker in making .....

4 [A] What happens when ... ? *(5 marks)*

1. Squeezing half a lemon on a beaker contains a little amount of sodium carbonate.

.....

2. Inserting a lighted magnesium ribbon in a cylinder filled with CO_2

.....

3. The percentage of carbon dioxide gas in air decreases.

.....

[B] Mention two properties for carbon dioxide gas.

.....

.....

5 Put (✓) in front of the correct statements and (✗) in front of the incorrect ones, then correct it : *(5 marks)*

1. Carbon dioxide is used in extinguishing fires. ( )

.....

2. The black substance that deposits on the wall of the cylinder due to the reaction between carbon dioxide and magnesium ribbon is magnesium oxide. ( )

.....

3. Global warming is a phenomenon that occurs due to increasing the percentage of oxygen gas in air. ( )

.....

4. Carbon dioxide gas helps in burning. ( )

.....

5. Carbon dioxide gas is used in making dry ice and soft drinks. ( )

.....

Unit 3 Lessons 1 & 2

25

Test yourself 8

Answer the following questions :

1 Choose the correct answer : *(5 marks)*

1. Ozone molecule consists of ..... atoms linked together.
   a. three hydrogen b. three oxygen
   c. two oxygen d. two hydrogen and one oxygen
2. Clear limewater is a solution of .....
   a. calcium carbonate. b. sodium carbonate.
   c. sodium hydroxide. d. calcium hydroxide.
3. Carbon dioxide is used in making .....
   a. soft drinks. b. dry ice. c. bread. d. (a) , (b) and (c).
4. Adding lemon juice onto ..... produce carbon dioxide.
   a. sodium chloride b. sodium bicarbonate
   c. calcium chloride d. (a) , (b) and (c)
5. Which of the following is heavier than air ? .....
   a. Oxygen gas. b. Carbon dioxide gas.
   c. (a) and (b). d. No correct answer.

2 [A] Give reasons for the following : *(5 marks)*

1. Oxygen gas is collected by downward displacement of water, while carbon dioxide gas is not collected by this method.
   .....
   .....
2. Drinking big quantities of soft drinks has many bad effects on the human health.
   .....
   .....
3. Oxygen gas is not used in putting off fires.
   .....

[B] Name the gas that leads to :

1. Corrosion and damage of ironware. (.....)
2. Suffocation of living organisms. (.....)

Test yourself

3 Complete the following sentences : *(5 marks)*

1. In the atmospheric air, oxygen gas represents ..... % , while carbon dioxide gas represents ..... %
2. The solid chemical substance used during preparation of oxygen is ....., while the solid chemical substance used during preparation of carbon dioxide is .....
3. Green plants use ..... gas during their respiration, while they produce ..... gas during photosynthesis.
4. The temperature of ..... flame rises to 3500°C, so it is used in .....
5. When a lighted magnesium ribbon is placed in a jar filled with ..... gas, a white powder and a ..... substance are produced.

4 [A] What happens if ... ? *(5 marks)*

1. Ironware are not painted.
.....
.....
2. Calcium carbonate reacts with dilute hydrochloric acid.
.....
.....
3. Yeast is added to dough during making bread.
.....
.....
.....

[B] Put (✓) or (✗) :

1. Oxygen and carbon dioxide scarcely dissolve in water. ( )
2. Exhaled air contains a big amount of oxygen gas. ( )
3. Limewater is used to detect oxygen gas. ( )
4. Carbon dioxide gas doesn't burn and doesn't help in burning. ( )

5 [A] Compare between : *(5 marks)*

Point of comparison	Oxidation	Combustion
Definition :	.....	.....
	.....	.....
	.....	.....

[B] Mention one use of each of the following :

1. Oxygen gas : .....
2. Carbon dioxide gas : .....

Unit 3 Lesson 3

25

Test yourself 9

Answer each of the following questions :

1 Complete the following sentences : *(5 marks)*

1. During preparation of nitrogen gas, we use ..... to remove oxygen from air and use potassium hydroxide to remove ..... from air.
2. ..... exists in protein substances.
3. The roots of legumes contain ..... that helps these plants to produce ..... from atmospheric nitrogen.
4. The percentage of nitrogen gas in air is ..... , while the percentage of oxygen represents .....
5. ..... gas and ..... gas are collected by downward displacement of water.
6. ..... gas that represents 78 % of the air volume is scarcely soluble in water.

2 Put (✓) or (✗) , then correct : *(5 marks)*

1. Nitrogen molecule consists of one nitrogen atom. ( )

.....

2. Nitrogen is very important gas as it forms protein substance. ( )

.....

3. Concentrated sodium hydroxide is used to absorb oxygen gas from air. ( )

.....

4. Oxygen reacts with nitrogen during lightning forming nitrogen oxide. ( )

.....

5. Nitrogen gas is collected by upward displacement of air. ( )

.....

3 Give reasons for : *(5 marks)*

1. During preparation of nitrogen, we pass air over hot copper.

.....

2. Nitrogen is called lifeless gas.

.....

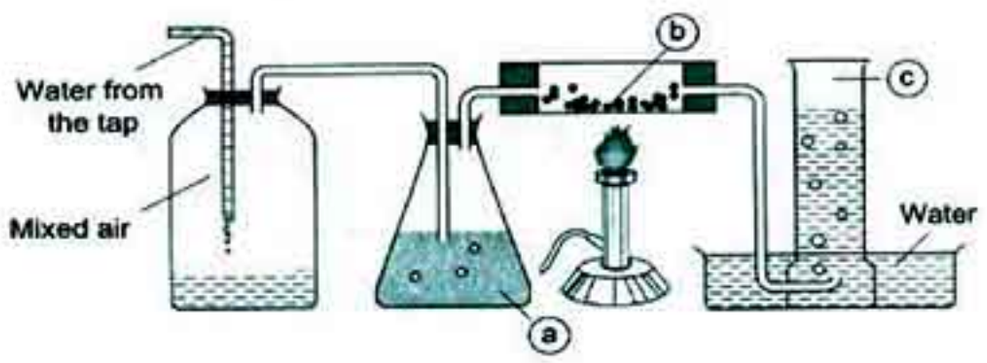
.....

3. Legumes are rich in protein substances.

.....

.....

4 Look at the opposite apparatus, then answer : *(5 marks)*



1. Passing air over solution ⓐ to

.....

2. Passing air through tube ⓑ to

.....

3. The gas that is collected in the cylinder is .....

4. Write the labels :

ⓐ .....

ⓑ .....

ⓒ .....

5. What happens if the flask that contains solution ⓐ is removed from the apparatus ?

.....

5 Compare between nitrogen gas and oxygen gas according to the percentage in air and preparation : *(5 marks)*

.....

.....

.....

.....

.....

.....

Unit 3 Lesson 3

25

Test yourself 10

Answer each of the following questions :

1 Complete the following sentences : *(5 marks)*

1. Nitrogen is used in filling ..... and some types of .....
2. Liquefied nitrogen is used in ..... and .....
3. ..... gas (that represents 78 % of air volume) scarcely dissolves in water, while ..... gas easily dissolves in water.
4. Nitrogen gas is used in making ..... , ... and .....

2 Choose the correct answer : *(5 marks)*

1. All the following are from the properties of nitrogen gas except .....
   a. it is easily soluble in water. b. it doesn't help in burning.
   c. it is colourless, tasteless and odorless.
   d. it can be condensed into a liquefied state.
2. All the following are from the importance of nitrogen gas except .....
   a. it is important for respiration process.
   b. it is used in manufacturing of soil fertilizers.
   c. it is used in treatment of skin tumors.
   d. it is used in making gunpowder.
3. ..... gas has a pungent smell.
   a. Ammonia b. Carbon dioxide c. Oxygen d. Nitrogen
4. Nitrogen is used in .....
   a. manufacturing of electronic devices.
   b. filling some types of lamps.
   c. storing petroleum.
   d. (a) , (b) and (c)
5. Recently, car tires are filled with ..... gas.
   a. oxygen b. nitrogen c. carbon dioxide d. carbon

Test yourself

3 [A] Give reasons for : *(5 marks)*

1. Nitrogen gas doesn't easily react with a lot of elements.

.....

2. On putting a lighted fragment (match) in a cylinder filled with nitrogen, the fragment is put off.

.....

[B] Mention three properties of nitrogen gas.

.....

.....

---

4 Compare between oxygen gas, nitrogen gas and carbon dioxide gas according to their properties and uses : *(5 marks)*

(1 point only in each item)

.....

.....

.....

.....

.....

.....

---

5 The two pictures represent steps in an activity : *(5 marks)*

1. Arrange the pictures to show the steps of the activity.

.....

.....

2. By adding water to the white substance,

..... smell of ..... gas evolves.

3. We conclude from this activity that :

.....

.....

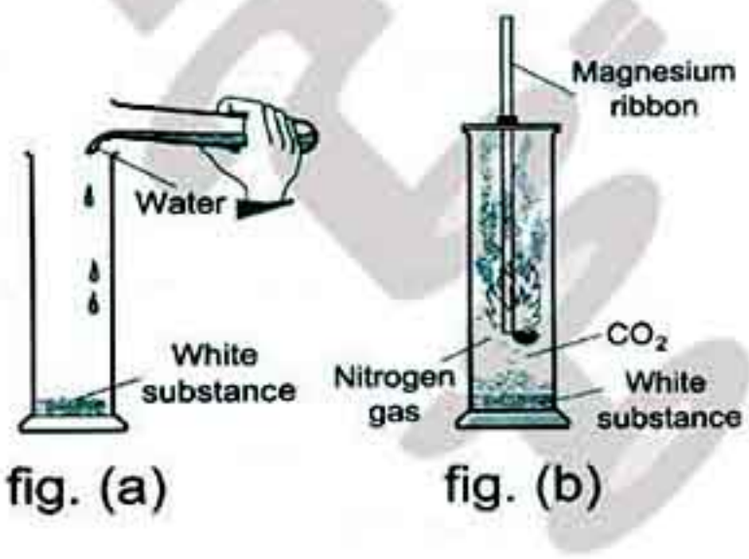


fig. (a) fig. (b)

General Exercises of the School Book on Unit 3

1 Put (✓) in front of the correct statements and (✗) in front of the false ones and correct the false ones :

1. The nodular bacteria fix oxygen of air in the roots of leguminous plants such as beans and clover. ( )

.....

.....

2. Oxygen gas occupies 78% of the atmospheric air components. ( )

.....

2 Justify (Give reasons for the following) :

1. Nitrogen is used to store petroleum and some flammable materials.

.....

2. The clear limewater is used in detection of carbon dioxide gas.

.....

3 Explain how you get :

1. Oxygen gas from hydrogen peroxide.

.....

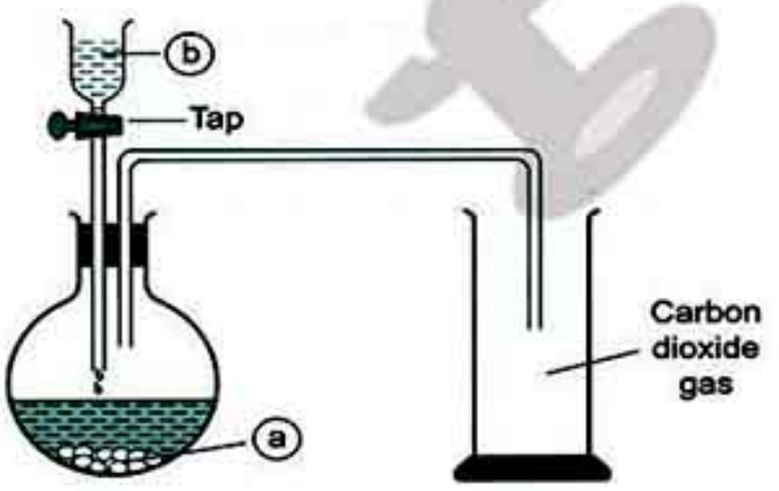
.....

2. Carbon dioxide gas from wood.

.....

4 Look at the opposite figure, then answer :

1. Write what represents each label on figure :
   - Substance (a) : .....
   - Liquid (b) : .....



2. Mention the uses of carbon dioxide gas :
   1. .....
   2. .....
   3. .....

Model Exam 1 on Unit 3

25

Answer the following questions :

1 Complete the following statements : *(5 marks)*

1. Oxygen is produced from ..... process, and it represents ..... % of the volume of the atmospheric air.
2. Nitrogen is used in the manufacture of ..... which doesn't rust.
3. Oxygen combines with acetylene gas to produce .....
4. When nitrogen reacts with a burning magnesium ribbon, ... is formed which dissolves in water to produce ..... gas.
5. During preparation of oxygen, hydrogen peroxide is dissociated into ..... and .....
6. Carbon dioxide is produced during ..... and ..... processes.

---

2 [A] Give reasons for : *(5 marks)*

1. The percentage of oxygen remains constant in the atmosphere.

.....

.....

2. Nitrogen is recently used in filling car tires.

.....

[B] Put (✓) or (✗) :

1. Carbon dioxide gas doesn't burn and doesn't help in burning. ( )
2. Nitrogen is called azote which means gas of life. ( )
3. Oxygen gas occupies about one fifth of the air volume. ( )
4. Limewater is used to detect the presence of nitrogen gas. ( )

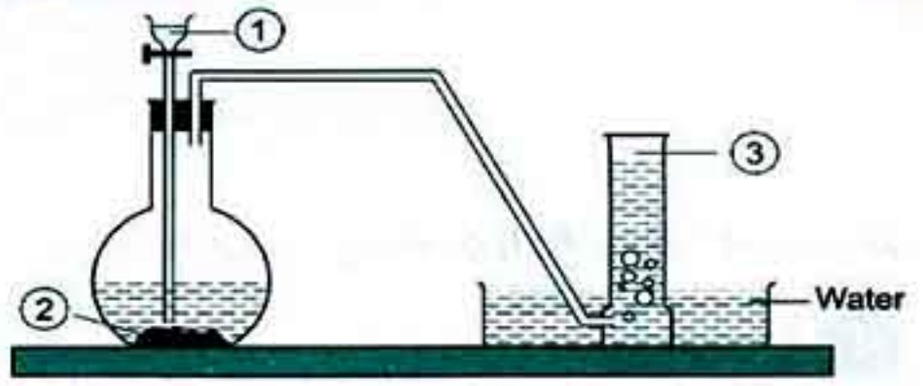
---

3 [A] Write the scientific term : *(5 marks)*

1. A gas that composes protein substance that builds up our bodies. (.....)
2. A gas that its molecule is composed of three oxygen atoms. (.....)
3. The method that is used to collect carbon dioxide gas during its preparation. (.....)

1 Part

[B] The shown apparatus represents the preparation of oxygen gas in the laboratory :



1. Label the figure :
   ① .....
   ② .....
   ③ .....
2. Oxygen gas is collected by downward displacement of water, Why ?

.....

4 Choose the correct answer : *(5 marks)*

1. Nitrogen gas is used in the manufacture of .....
   a. fire extinguishers. b. soil fertilizers. c. soft drinks. d. dry ice.
2. A gas which turns limewater into turbid is ..... gas.
   a. oxygen b. nitrogen c. ozone d. carbon dioxide
3. ..... are from the air pollutants.
   a. Dust particles b. Smoke
   c. Gases produced by factories d. (a) , (b) and (c)
4. The rapid combination between oxygen and elements producing heat and light is called .....
   a. oxidation. b. burning. c. respiration. d. reduction.
5. Which of the following is from the uses of carbon dioxide gas ? .....
   a. Formation of ozone layer. b. Making dry ice.
   c. Cutting and welding of metals. d. Mechanical ventilation.

5 [A] What happens when ... ? *(5 marks)*

1. Ozone layer is decayed.

.....

2. Drinking big quantities of soft drinks.

.....

[B] Correct the underlined words :

1. Water is composed of oxygen and **nitrogen**. (.....)
2. **Solid** nitrogen is used to treat the skin tumors. (.....)
3. **Oxygen** gas is emitted as a result of the combustion of organic materials. (.....)

Model Exam 2 on Unit 3

25

Answer the following questions :

1 Complete the following sentences : *(5 marks)*

1. Rusting of iron is due to the presence of water and ..... gas, whereas ..... gas is used in making stainless steel which doesn't rust.
2. Nitrogen gas reacts with ..... during lightning forming .....
3. Both ..... gas and ..... gas are scarcely dissolve in water.
4. During preparation of nitrogen, sodium hydroxide is used to remove ....., while hot copper is used to remove ..... from the atmospheric air.
5. Among the gases that don't help in burning, ... gas and ..... gas.

---

2 [A] Give reasons for the following : *(5 marks)*

1. The mass of a cleansing wire increases after burning.
.....
.....
2. A pungent odour is evolved as a result of addition of water to the product of burning magnesium in nitrogen.
.....
.....
3. Although carbon dioxide has the smallest percentage in the air, but it is very important in life continuity on the Earth.
.....
.....

[B] Correct the following sentences :

1. Oxygen and carbon dioxide gases represent most of the atmospheric air.
.....
2. Carbon dioxide gas is lighter than the air.
.....

---

3 Write the scientific term : *(5 marks)*

1. A molecule which is formed of two hydrogen atoms combine with one oxygen atom.
(.....)

1 Part

2. A flame which is used in welding and cutting metals. (.....)
3. A phenomenon that occurs due to increasing of the percentage of carbon dioxide gas in atmospheric air. (.....)
4. A gas used in the storage of flammable substances. (.....)
5. A kind of plants such as clover, peas and soybeans. (.....)

4 [A] What happens when ... ?

1. The nodular bacteria are not found in the soil.

.....

.....

2. Carbon dioxide gas reacts with calcium hydroxide dissolved in water.

.....

.....

[B] Name the gas that :

1. Its molecule is composed of one carbon atom and two oxygen atoms. (.....)
2. Forms the protein substance. (.....)
3. Is used for patients who suffer from breathing difficulties. (.....)

5 Complete the following table : *(5 marks)*

Points of comparison	Nitrogen gas	Carbon dioxide gas	Oxygen gas
1. Its ratio in the atmosphere :	.....	.....	.....
2. Its reaction with lighted magnesium ribbon :	..... substance is produced that reacts with water to form ..... gas.	They produce ..... powder and ..... substance deposits on the wall of the cylinder.	..... substance is produced which is known as .....

Unit 4 Lesson 1

25

Test yourself 11

Answer each of the following questions :

1 Complete the following sentences : *(5 marks)*

1. The human nervous system consists of two main systems which are ..... and .....
2. The axon of neuron is covered with ..... layer called ..... sheath.
3. The outer surface of the two hemispheres is a ..... matter called .....
4. The brain is composed of ..... , ... and .....
5. The central nervous system is composed of ..... and spinal cord.

2 [A] Give reasons for : *(5 marks)*

1. The presence of the brain inside the skull.

.....

2. Damage of medulla oblongata leads to death.

.....

3. Dentrites extend from the neuron's body.

.....

[B] Put (✓) or (✗) :

1. Medulla oblongata lies at the back area of the brain below the two cerebral hemispheres. ( )
2. Cerebellum controls the voluntary movements in the human body. ( )
3. The cell body of neuron contains of nucleus, cytoplasm and plasma membrane. ( )
4. In the cerebral hemispheres, the gray matter is surrounded by the white matter. ( )

3 [A] Write one function for each of the following : *(5 marks)*

1. The two cerebral hemispheres :

.....

2. Cerebellum :

.....

3. Medulla oblongata :

.....

1 Part

[B] Write the scientific term :

1. The building unit of the nervous system. (.....)
2. It is a nerve block containing millions of neurons. (.....)
3. The largest part of the brain. (.....)
4. A cylindrical axis covered with a fatty layer called myelin sheath. (.....)

4 [A] Locate each of the following parts in the human body : *(5 marks)*

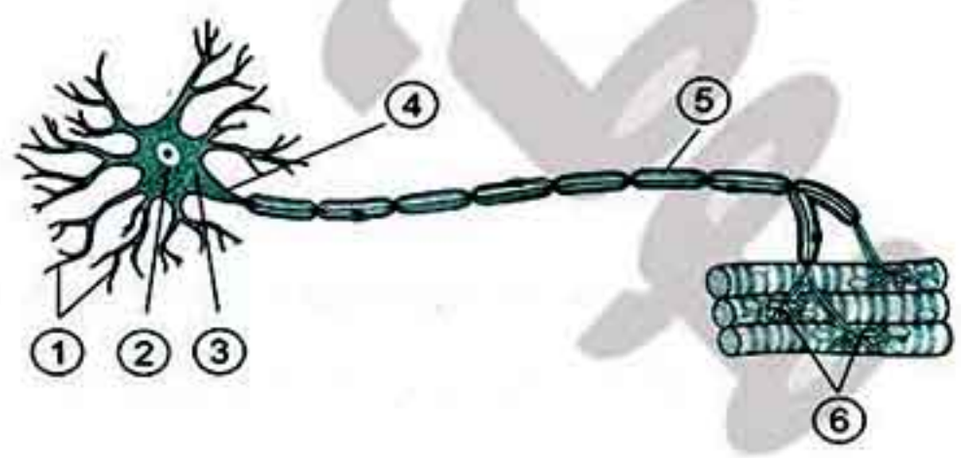
1. The cerebellum :
.....
2. The cerebral cortex :
.....
3. The medulla oblongata :
.....
4. The brain :
.....

[B] Choose the correct answer :

1. ..... connects the brain with the spinal cord.
   a. Cerebellum b. Cerebrum
   c. Medulla oblongata d. Axon
2. The ..... system interprets the external stimuli and makes the body respond to them.
   a. respiratory b. digestive c. circulatory d. nervous

5 Look at the following figure, then answer : *(5 marks)*

1. Label the figure :
   ① .....
   ② .....
   ③ .....
   ④ .....
   ⑤ .....
   ⑥ .....



2. This figure shows the structure of ..... cell which is the basic structure unit of ..... system.
3. What is the function of part number ① ?
.....

Unit 4 Lesson 1

25

Test yourself 12

Answer each of the following questions :

1 Choose the correct answer : *(5 marks)*

1. ..... is (are) from the reflex action(s).
   a. Heartbeats
   b. Trying balance during sliding down
   c. Secreting saliva when smelling good food
   d. (b) and (c)
2. The gray matter in the spinal cord appears in the shape of letter .....
   a. H b. Y c. F d. A
3. ..... is responsible for delivering the nerve messages from the body organs to the brain and vice versa.
   a. Cerebellum b. Cerebrum c. Skull d. Spinal cord
4. The centers of the five senses locate in the .....
   a. two cerebral hemispheres. b. spinal cord.
   c. medulla oblongata. d. cerebellum.
5. Peripheral nervous system consists of ..... pairs of nerves.
   a. 31 b. 21 c. 12 d. 43

---

2 [A] What happens when ... ? *(5 marks)*

1. Drinking a lot of tea and coffee every day.
   .....
   .....
2. Your finger gets pricked by the plant thorns.
   .....
   .....

[B] Complete the following sentences :

1. The peripheral nervous system consists of ..... pairs of cranial nerves and ..... pairs of spinal nerves.
2. ..... and ..... are from the bad effects caused as a result of addiction.
3. In the spinal cord, the ..... matter is surrounded by the ..... matter.

1 Part

3 [A] Write one function for each of the following : *(5 marks)*

1. Spinal cord :

.....

2. Peripheral nervous system :

.....

.....

.....

[B] Put (✓) or (✗) :

1. There are 10 pairs of nerves come out of the brain known as the cranial nerves. ( )
2. The spinal cord is responsible for the reflex actions in the human body. ( )
3. To keep your nervous system healthy, you should increase the intake of stimulants. ( )

4 [A] Give reasons for : *(5 marks)*

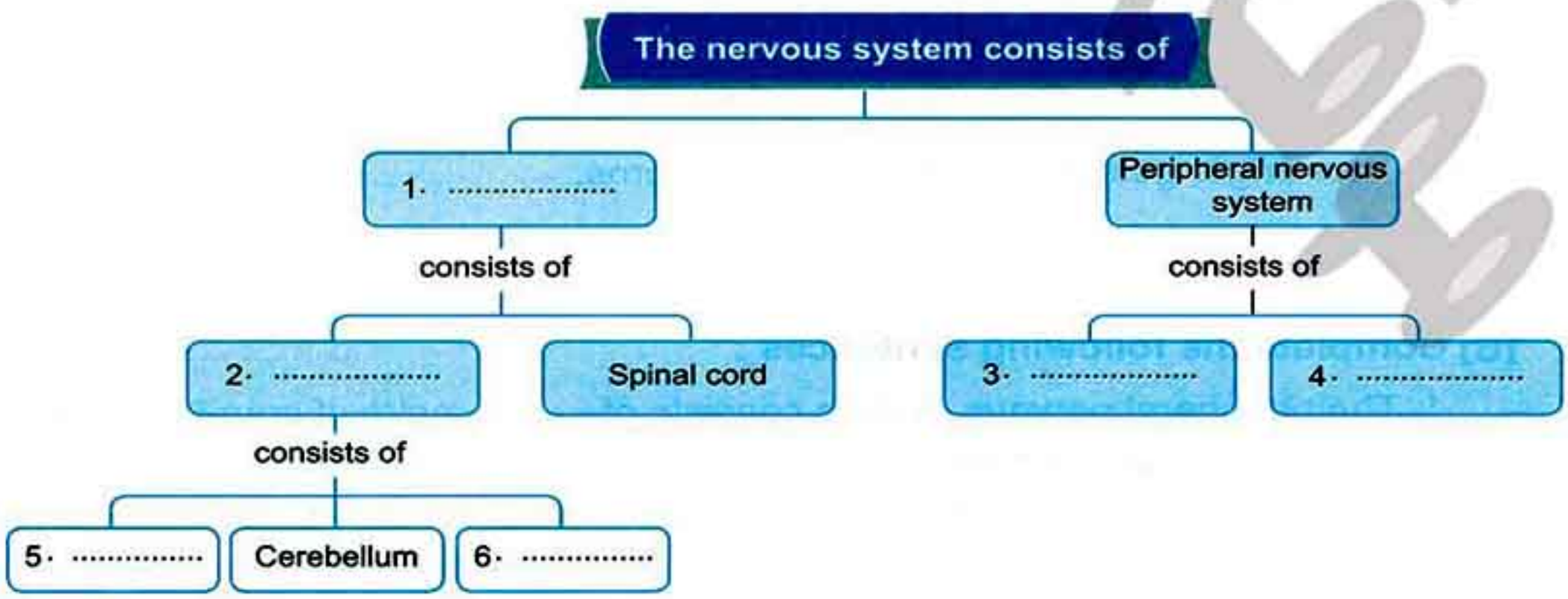
1. The spinal cord is surrounded by the vertebrae of the backbone.

.....

2. The withdrawal of the hand quickly when it suddenly touches a hot surface.

.....

[B] Complete the following diagram :



Test yourself

5 [A] Write the scientific term : *(5 marks)*

1. Spontaneous response from the body to different stimuli.

(.....)

2. The organ that is responsible for the reflex actions in the human body.

(.....)

3. A group of nerves which emerge from the central nervous system.

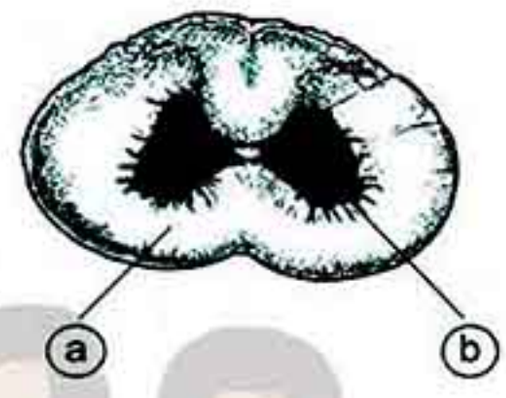
(.....)

[B] Look at the following figure, then complete :

1. This figure represents the structure of .....
2. Label the figure :

ⓐ .....

ⓑ .....



[C] How to maintain the human nervous system ?
(two points only)

1. .....
.....
2. .....
.....

Unit 4 Lesson 2

25

Test yourself 13

Answer each of the following questions :

1 Complete the following sentences : *(5 marks)*

1. The axial skeleton consists of ..... , ... and .....
2. Knee joint is from ..... joints, while hip joint is from ..... joints.
3. The backbone is related to the ..... skeleton, while humerus is related to ..... skeleton.
4. The ribcage consists of ..... pairs of ribs.
5. The human locomotory system consists of ..... and .....

---

2 [A] Give reasons for : *(5 marks)*

1. The presence of cartilages between vertebrae of the backbone.

.....

2. You must eat healthy food, that rich in calcium.

.....

3. The ribcage surrounds the heart and lungs.

.....

[B] Put (✓) or (✗) :

1. Wrist joint is from freely movable joints. ( )
2. Cartilages connect bones with muscles. ( )
3. The backbone is composed of 31 vertebrae. ( )
4. The first 10 pairs of ribs are connected to the sternum. ( )

---

3 [A] Write one function for each of the following : *(5 marks)*

1. The skull :

.....

2. The vertebral column :

.....

3. The upper limbs :

.....

[B] Match :

(A)	(B)
1. Tendons	a. the area of two bones meeting.
2. Joints	b. long strips that fix muscles with bones.
3. Slightly movable joints	c. allow movement in all directions.
4. Freely movable joints	d. allow movement in one direction only.

1. ..... 2. ..... 3. ..... 4. .....

4 [A] Compare between : *(5 marks)*

Points of comparison	Voluntary muscles	Involuntary muscles
1. Definition :	....	....
2. Example :	.....	.....

[B] Cross out the odd word :

1. Skull – backbone – femur – ribcage. (.....)
2. Humerus – hand bones – forearm bones – vertebral column. (.....)
3. Shoulder joint – knee joint – wrist joint – thigh joint. (.....)
4. Ribcage – femur – shaft bones – foot bones. (.....)

5 [A] Examine the opposite figure, then answer : *(5 marks)*

1. The figure represents the .....
2. Label the figure :
   ① .....
   ② .....
   ③ .....

[B] Mention three ways to maintain your locomotory system :

1. .....
2. .....
3. .....

General Exercises of the School Book on Unit 4

1 Choose the correct answer :

1. Myelin sheath surrounds the .....
   a. nerve cell axon. b. cerebellum. c. spinal cord.
2. Reflex action takes place through the .....
   a. medulla oblongata. b. cerebral hemispheres. c. spinal cord.
3. The joint is the location of meeting of .....
   a. two bones. b. a muscle with a bone. c. two muscles.
4. ..... fix muscles with bones.
   a. Tendons b. Joints c. Muscle fibres
5. Skulls joints are .....
   a. immovable. b. slightly movable. c. free movable.

2 Give the scientific term for each of the following statements :

1. The building unit of nervous system. (.....)
2. The organ which consists of an internal H-shaped grey matter surrounded with a white matter. (.....)
3. The autonomic body response towards different stimuli. (.....)
4. The skeleton which includes the upper and lower limbs. (.....)

3 Mention the location of the following parts in human body :

1. Medulla oblongata.
   .....
2. The H-shaped grey matter.
   .....
3. The cerebellum.
   .....
4. The spinal cord.
   .....

4 State the importance of each of the following :

1. Tendons.

.....

2. Cerebellum.

.....

3. Joints.

.....

.....

4. Cerebral hemispheres.

.....

.....

.....

5. Ribcage.

.....

.....

5 Give reasons for :

1. The rapid withdrawal of the hand on sudden touching thorns of a plant.

.....

.....

.....

2. Muscles play an important role in human movement.

.....

.....

3. Damage of medulla oblongata may lead to death.

.....

.....

Model Exam 1 on Unit 4

25

Answer the following questions :

1 Complete the following statements : *(5 marks)*

1. The brain consists of ..... , ... and .....
2. The backbone consists of ..... vertebrae, where ..... is protected inside it.
3. The outer surface of the two hemispheres is a ..... matter, while the outer surface of the spinal cord is a ..... matter.
4. In the ribcage, there are ..... pairs of ribs are connected to the sternum.
5. The nervous system consists of two main systems which are ..... and .....

---

2 Choose the correct answer : *(5 marks)*

1. To maintain your locomotory system you must .....
   a. avoid straining the neck. b. avoid carrying heavy things.
   c. Exposure to sunlight for long periods. d. (a) , (b) and (c).
2. Eating healthy food rich in calcium, phosphorus and vitamin D .....
   a. prevent rickets. b. prevent heart disease.
   c. prevent osteomalacia. d. (a) and (c).
3. To maintain the human nervous system, you must .....
   a. stay away from tranquilizers. b. keep close to computer.
   c. live in noisy places. d. (a) and (c).
4. The peripheral nervous system consists of .....
   a. 31 pairs of cranial nerves and 12 pairs of spinal nerves.
   b. 12 pairs of cranial nerves and 31 pairs of spinal nerves.
   c. 31 pairs of spinal nerves only.
   d. 12 pairs of cranial nerves only.
5. ..... is responsible for reflex action.
   a. Spinal cord and cerebellum b. Spinal cord
   c. Medulla oblongata d. Cerebrum.

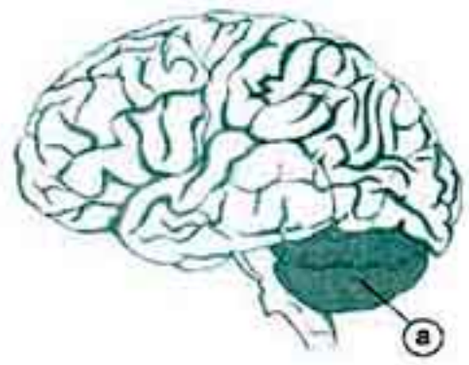
Test yourself

3 [A] From the opposite figure : *(5 marks)*

1. What is the name of this labeled part (a) ? and determine its function ?

.....

.....



[B] Give the scientific term :

1. A cylindrical axis covered with a fatty layer in the nerve cell. (.....)
2. Joints which allow movement in one direction only. (.....)

4 Look at the opposite figures, then answer the following questions : *(5 marks)*

1. What is the name of fig. (a) and fig. (b) ?

.....

.....

2. Fig. (a) consists of ..... and ..... skeleton.
3. What is the function of ribcage ?

.....

.....

4. The skull protect .....
5. The bones of upper limbs are ..... , ... and .....

Fig. (a)

Fig. (b)

5 [A] What happens when ... ? *(5 marks)*

1. There is no backbone.

.....

2. Your finger gets picked by plant thorns.

.....

[B] Put (✓) or (✗) :

1. The cerebellum regulates heartbeats. ( )
2. The outer matter of spinal cord has the shape of letter (H). ( )
3. The central nervous system consists of cranial nerves and spinal nerves. ( )

Model Exam 2 on Unit 4

25

Answer the following questions :

1 Complete the following sentences : *(5 marks)*

1. The nerve cell consists of two main parts which are ..... and .....
2. There are ..... pairs of ribs in the ribcage, whereas there are ..... pairs of nerves come out of the spinal cord.
3. The brain is protected by ....., while the spinal cord is protected by .....
4. The gray matter in the cerebrum is called .....
5. The backbone contains ..... between its ..... to prevent their friction.
6. The human locomotory system consists of ..... system and the muscular system.

---

2 [A] What happens when ... ? *(5 marks)*

1. The medulla oblongata is damaged.

.....

.....

2. There are no tendons in the locomotory system.

.....

.....

[B] Correct the following sentences :

1. Upper limbs in human skeleton are connected to the pelvic bones.

.....

2. The axon of a neuron ends in nerve endings called dendrites.

.....

3. The muscles of the blood vessels are voluntary muscles.

.....

---

3 [A] Give reasons for the following : *(5 marks)*

1. Your hand moves away quickly when it touches a hot surface.

.....

2. Food rich in calcium, phosphorus and vitamin D are essential for your body.

.....

3. Shoulder joint is a freely movable joint.

.....

[B] Cross out the odd word, then write the scientific term for the remaining words :

1. Cerebrum - Spinal cord - Medulla oblongata - Cerebellum.
   - The odd word is .....
   - The scientific terms is .....
2. Femur - Foot bones - Skull - Shaft bones.
   - The odd word is .....
   - The scientific term is .....

4 Write the scientific term : *(5 marks)*

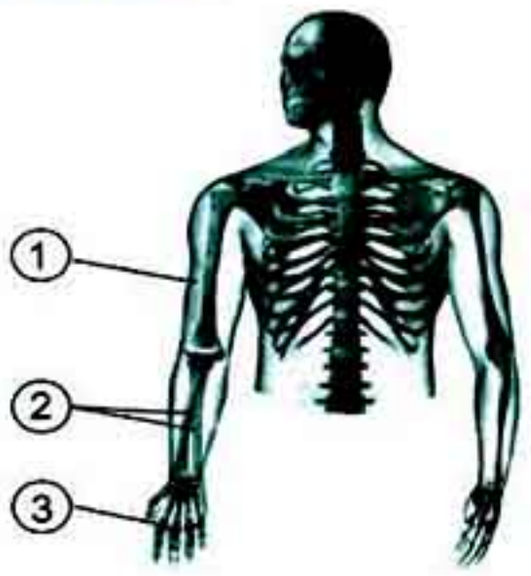
1. Joints that allow movement in all directions. (.....)
2. The main control center in the human body. (.....)
3. A part of the nervous system that is responsible for the reflex action. (.....)
4. The location at which bones meet each other. (.....)
5. The part of the brain that controls the involuntary processes in your body. (.....)

5 [A] Compare between : *(5 marks)*

Points of comparison	Cranial nerves	Spinal nerves
1. Definition :	....	....
2. Number :	.....	.....

[B] Look at the opposite figure, then label the numbered bones :

① ..... bone.
② ..... bones.
③ ..... bones.



Test yourself 1

❶
1. Balance scale - spring scale
2. weight - mass 3. gravity - weight
4. gram - kilogram - Newton
5. $\frac{1}{6}$

❷
[A] 1. Because the gravity of a planet depends on its mass, so the weight of any object will change from a plant to another.
2. To prevent any vibration of the balance scale.
3. Because the weight of the person decreases as the distance between the person and the center of the Earth increases.

[B] 1. (✓) 2. (✗) 3. (✗) 4. (✗)

❸
[A]

30 kg.	1 kg.	3000 gm.
300 Newton	10 Newton	30 Newton

[B] 1. Sensitive two arm scale.
2. Kilogram.

❹
[A] 1. It is the gravitational force by which the body is attracted to the Earth.
2. It is the amount of matter in an object.

[B] 1. a. decreases. 2. d. spring scale.
3. b. 10

❺
[A] 1. d 2. b 3. a 4. c

[B] 1. Its mass on the moon = Its mass on the Earth = 60 kg.
2. Its weight on the Earth = Mass × 10
= 60 × 10 = 600 Newton.
3. Its weight on the moon
= $\frac{1}{6}$ × 600 = 100 Newton

1

❶
1. d. spring scale. 2. b. 2 kg.

❷
1. balance scale - spring scale.
2. the place.
3. the object's mass - planet (place) where the object exists - the distance between the object and the centre of the planet.

❸

Points of comparison	Mass	Weight
- Definition :	The amount of matter in an object.	The gravitational force by which the body is attracted to the Earth.
- Unit of measurement :	Kilogram or gram.	Newton.
- Device of measurement :	Balance scale – Sensitive two arms scale – one arm digital scale – one arm scale with a pointer.	Spring scale.
- Direction :	It has no effect.	Its effect is always directed towards the center of the Earth (downwards).
- Effect of different places :	Constant. (It does not change with changing the place).	Variable (It changes with changing the place).

❹
1. Its mass on the moon = Its mass on the Earth = 30 kg
2. Its weight on the Earth
= Mass × 10 = 30 × 10 = 300 Newton.
3. Its weight on the moon = $\frac{1}{6}$ × 300
= 50 Newton.

1 1

❶
1. one paper clip - small - jewellery
2. a constant - the place of the matter.
3. Newton - the Earth's - 100
4. Its mass 5. spring scale

❷
[A] 1. a. decreases 2. b. 20 Newton.
3. a. smaller than 4. c. 5 kg.

[B] 1. This means that the mass of this person equals 70 kg.
2. This means that the weight of this watermelon equals 20 Newton.

❸
[A] 1. (✗) 2. (✓) 3. (✗) 4. (✓)

[B]

Points of comparison	Mass	Weight
Measuring devices :	- Balance scale. - Sensitive two arm scale. - One arm digital scale. - One arm scale with a pointer.	Spring scale.
The effect of changing the place :	Constant (it does not change with changing the place).	Variable (it changes with changing the place and changes from a planet to another.

❹
[A] 1. gram or kilogram 2. Newton
[B] 1. Fig. (a) : Balance scale.
Fig. (b) : Sensitive two arms scale.
2. Sensitive two arms scale is used to measure small masses as gold and chemicals.

❺
[A] 1. Because the Earth has greater mass and gravitational force than the moon.
2. Because the mass of any matter is a constant value and it does not change by changing the place of matter.

[B] 1. Weight of the object on the Earth's surface = 6 × weight on moon = 6 × 8 = 48 Newton.
2. Mass of the object
= $\frac{\text{Weight of the object on Earth's surface}}{10}$
= $\frac{48}{10}$ = 4.8 kg.

2 1

❶
1. d. (a) , (b) and (c). 2. b. 0.1 kg.
3. a. decreases. 4. a. 6
5. c. 36 kg.

❷
[A] 1. Because the mass of the Earth is more than that of the moon.
2. Because the gravitational force of the Earth attracts the hanged body downward, that causes the expand of the wire of spring scale.

[B] 1. Gram 2. mass
3. equal to 4. Newton

❸
[A] 1. Mass. 2. Weight.
[B] 1. The object's mass.
2. The planet (place) where the object exists.
3. The distance between the object and the center of the planet.

❹
[A] 1. The weight of your body on the moon will decrease to $\frac{1}{6}$ of the weight of your body on the Earth.
2. All objects on the Earth's surface don't have weight.

[B] 1. Balance scale. 2. Spring scale.
3. Sensitive two-arms scale.

❺
1. Weight on Earth = mass × 10
480 = mass × 10
mass on Earth = $\frac{480}{10}$ = 48 kg.
2. Its mas on the moon = 48 kg.
3. Weight on the moon = $\frac{1}{6}$ × weight on Earth.
= $\frac{1}{6}$ × 480 = 80 newton.

Test yourself 2

❶
1. hotness - coldness
2. bad - good.
3. metals - good
4. insulating - wood
5. energy - thermometer.

❷
[A] 1. Because copper allows heat to flow through , while wood doesn't allow heat to flow through.
2. Because aluminium is good conductor of heat.
3. To keep our bodies warm as they are heat insulators.

[B] 1. (✗) different.
2. (✗) hot object to cold object.

❸

Points of comparison	Heat conductors	Heat insulators
1. Definition :	They are materials that let heat flow through.	They are materials that don't let heat flow through.
2. Examples :	Iron – copper.	Glass – plastic.
3. One use :	They are used in making cooking pots.	They are used in making handles of cooking pots.

❹
[A] 1. It is a form of energy that transfers from the higher temperature object to the lower temperature object.
2. It is the degree of hotness or coldness of a body.

[B] 1. Heat conductors. 2. Copper.
3. Heat insulators.

❺
[A] • Observations :
1. You feel hot when touching aluminium and iron rods.
2. You don't feel hot when touching wood and plastic rods.
• Conclusion :
Materials differ in conducting heat.

[B]

Heat conductors	Heat insulators
Iron - Copper - Aluminium - Stainless steel.	Plastic - Air - Wood - Water.

Test yourself 3

❶
1. volume - temperature.
2. Celsius thermometer - medical thermometer.
3. zero - 100
4. $10 - \frac{1}{10}$
5. heating - cooling.

❷
[A] 1. Because mercury is :
a. A liquid metal that can be seen easily through the thermometer glass.
b. A good conductor of heat.
c. A regular expanding material.
d. Doesn't stick to the wall of the capillary tube.
2. To prevent mercury from going back to the bulb quickly in order to read the measurement easily.
3. Because mercury inside the thermometer is toxic.

[B] 1. (✓) 2. (✓) 3. (✓) 4. (✗)

❸
[A] 1. The medical thermometer will be damaged, because the boiling point of water is 100°C
2. The medical thermometer will be broken and mercury which is toxic will harm my body.

[B] 1. b. medical 2. d. (a) and (b).
3. c. (a) and (b).

❹
1. Thermometer. 2. Constriction.
3. Ethyl alcohol. 4. Celsius thermometer.
5. 100°C

❺
1. ① Constriction. ② Mercury bulb.
③ Capillary tube .
④ Transparent thick glass tube.
2. Celsius thermometer - the temperature of liquids.

3. medical thermometer - the temperature of human body.
4. It prevents the mercury from going back to the bulb quickly in order to read the measurement easily.

2

❶
1. thermometers.
2. Celsius thermometer - medical thermometer.
3. Iron - copper - aluminium
4. Wood - plastic - air

❷
1. Thermometer. 2. Heat conductors.
3. Heat insulators.

❸
- Good conductors of heat :
They are used in making :
- Cooking pans (utensils).
- Kettles (boilers).
- Bad conductors of heat :
They are used in making :
1. The handles of :
- Cooking utensils. - Electric iron.
- Kettles.
2. Heavy blankets and woolen clothes.

❹
1.

Points of comparison	Celsius thermometer	Medical thermometer
- Structure :	a. Transparent thick glass tube. b. Capillary tube closed from one of its ends. c. Mercury bulb that is filled with mercury and connected to the other end of the capillary tube.	
- Scale :	From 0°C to 100°C	From 35°C to 42°C
- Used liquid :	Mercury.	Mercury.
- Usage :	It is used to measure the temperature of liquids.	It is used to measure the temperature of the human body.

2.

Points of comparison	Good conductors of heat	Bad conductors of heat
Definition :	They are materials that let heat flow through.	They are materials that don't let heat flow through.
Examples :	Copper, aluminium, iron and stainless steel.	Glass, wood, paper, plastic, wool, air, and rubber.
Uses :	They are used in making : - Cooking pans (utensils). - Kettles (boilers).	They are used in making : 1. The handles of : - Cooking utensils. - Electric iron. - Kettles. 2. Heavy blankets and woolen clothes.

❺
1. (✗) Celsius thermometer is used .....
2. (✗) The scale of the medical thermometer .....
3. (✗) Plastic is .....
4. (✗) Iron is .....

❻
1. Because mercury :
– is a liquid metal.
– is a good conductor of heat.
– is a regular expanding material.
2. Because wood and plastic are bad conductors of heat.
3. Because stainless steel and aluminium are good conductors of heat.
4. To prevent mercury from going back quickly to the bulb in order to read the measurement easily.

Model Exam ① on Unit 2

❶
1. iron - iron - good
2. plastic - wood.
3. Copper
4. volume - temperature
5. liquid - good

❷
[A] 1. Because all metal let heat flow through.
2. Because mercury is :
a. A liquid metal that can be seen easily through the thermometer glass.
b. A good conductor of heat.
c. A regular expanding material.
d. Doesn't stick to the walls of the capillary tube.
3. To prevent mercury from going back quickly to the bulb in order to read the measurement easily.
[B] 1. (✓) 2. (✗)

❸
[A] 1. a. a glass of hot tea to a glass of ice.
2. b. iron 3. c. 37°C
4. b. under 5. b. 0°C to 100°C
[B] 1. Fig. (a) : Medical thermometer.
Fig. (b) : Celsius thermometer.
2. The uses of fig. (a) : Used to measure human body temperature.
The uses of fig. (b) : Used to measure liquids temperature.

❹
[A] 1. Mercury.
2. Celsius thermometer.
3. Wool.
[B] 1. They are the materials that let heat flow through.
2. It is a form of energy that transfers from the higher temperature object to the lower temperature object.

❺
[A] 1. We can't hold the handles of cooking pots as aluminium is good conductor of heat.
2. The mercury will return back to the mercury bulb before determining the temperature reading.
3. The medical thermometer will be damaged, because the boiling point of water is 100°C, while the maximum temperature of the medical thermomter is 42°C.

[B] - The main idea of making thermometer is changing the volume of liquid by changing the temperature.

2 2

❶
1. b. Mercury. 2. d. (a) and (b).
3. c. Stainless steel. 4. b. Ethyl alcohol
5. a. more than

❷
[A] 1. To force the mercury back to the mercury bulb.
2. Because the temperature of my hand is higher than that of ice, so heat transfers from my hand to the piece of ice and I feel cold.
3. Because the scale of the medical thermometer ranges from 35°C to 24°C, while the temperature of boiling water is 100°C, so the thermometer will be broken.
[B] 1. (✓) 2. (✗) 3. (✓) 4. (✓)

❸
1. hotness – coldness.
2. zero – 100 3. wood – plastic.
4. medical – constriction 5. (– 39) – 357

❹
[A] 1. Heat energy will not transfer between the two bodies as they have the same temperature.
2. The mercury will return back quickly to the mercury bulb before determining the temperature reading.
[B] 1. d 2. c 3. a 4. b

❺
[A] 1. They are used in making the handles of cooking pots.
2. It is used to measure the temperature of human body.
3. It is used to measure the temperature of liquids.
[B] 1. It is a liquid metal.
2. It is a regular expanding material.

Test yourself 4

❶
1. Atmosphere.
2. manganese dioxide.
3. Downward displacement of water.
4. Photosynthesis process. 5. Catalyst.

❷
1. Carbon dioxide – nitrogen
2. Oxygen – combustion.
3. Oxygen – hydrogen peroxide
4. carbon dioxide – nutrients – oxygen gas.
5. $\frac{1}{5}$

❸
1. one fifth ($\frac{1}{5}$)
2. Oxygen occupies one fifth (21 %) of the air volume.
3. Because oxygen that exists in the cylinder is consumed during the candle burning, so water replaces oxygen in the cylinder.

❹
[A] 1. Because oxygen scarcely (rarely) dissolves in water.
2. Because they help in condensation of water vapour in the air that causes formation of rains or snow.
3. Because it remains without any change in its quantity and properties during the chemical reaction.
[B] 1. oxygen gas.
2. ① Hydrogen peroxide.
② Manganese dioxide.
③ Oxygen gas.

❺
[A] 1. b. it consists of oxygen and nitrogen only.
2. b. $\frac{1}{5}$
3. c. hydrogen peroxide.
[B] We cannot control burning processes as oxygen helps in burning.

Test yourself 5

❶
1. (✗) Oxygen is heavier than air, so it replaces air.
2. (✓)
3. (✗) ... , but it helps in burning.
4. (✗) ... increases ... 5. (✓)

❷
1. burning – oxidation
2. cutting – welding.
3. scarcely – downward displacement of water
4. magnesium oxide
5. three oxygen – two oxygen.
6. Iron rusting.

❸
[A] 1. Oxygen is a colourless, tasteless and odorless gas.
2. Oxygen scarceley dissolves in water.
3. Oxygen is heavier than air, so it replaces air.
[B] 1. The iron cubes will rust.
2. The burning fragment is still burning.

❹
[A] 1. Oxidation. 2. Ozone layer.
3. Water.
[B] 1. Oxygen cylinders is used during diving and climbing mountains.
2. Oxygen combines with acetylene gas to produce oxy-acetylene flame which is used in welding and cutting metals.

❺
[A] 1. d. (a) and (b).
2. d. acetylene with oxygen.
3. d. one oxygen atom and two hydrogen atoms.
[B] 1. Because it causes corrosion and damage of ironware as the bridges' pillars.
2. Because the ratio of oxygen gas decreases when we rise above the Earth's surface.

Test yourself 6

❶
1. d. photosynthesis process.
2. d. (a) , (b) and (c).
3. b. two oxygen atoms.
4. b. adding dilute hydrochloric acid to calcium carbonate.
5. a. calcium carbonate

❷
[A] 1. Due to :
a. Removal of forests.
b. Combustion of big amounts of fuel in factories and means of transport.
2. Because it easily dissolves in water.
3. Due to the formation of calcium carbonate which is insoluble in water that turns clear limewater into milky.
[B] 1. The limewater becomes turbid.
2. Carbon dioxide gas is produced during respiration of plants.

❸
1. dilute hydrochloric acid – calcium carbonate
2. upward – heavier
3. Removal of forests – combustion of big amounts of fuel
4. one carbon atom – oxygen atoms.
5. photosynthesis – respiration.

❹
1. carbon dioxide gas.
2. carbon dioxide gas
3. ⓐ Dilute hydrochloric acid.
ⓑ Calcium carbonate.
ⓒ Carbon dioxide gas.

❺
[A]

Oxygen gas	Carbon dioxide gas
It is prepared by adding hydrogen peroxide to manganese dioxide.	It is prepared by adding dilute hydrochloric acid to calcium carbonate.

[B] 1. (✓)
2. (✗) ... for green plants to build ...

Test yourself 7

❶
[A] 1. To produce carbon dioxide gas during fermentation that expanded by heat making bread porous and tasty.
2. Because it is used in :
– Making soft drinks. – Making bread.
– Extinguishing fires.
3. Because it doesn't burn and doesn't help in burning.
[B] magnesium oxide – carbon.

❷
[A] 1. d. It scarcely soluble in water.
2. c. It is used in making soft drinks.
3. a. carbon
[B] 1. Global warming.
2. Increasing the temperature of the Earth's atmosphere.

❸
1. carbon dioxide – fermentation.
2. liquid – dry ice
3. suffocation of living organisms - global warming.
4. photosynthesis – bread.

❹
[A] 1. Carbon dioxide gas evolves.
2. The magnesium ribbon keeps burning for a short time, then extinguishes forming white powder (magnesium oxide) and black substance (carbon).
3. Green plants cannot make photosynthesis process well, so the amount of oxygen will decrease in the air.
[B] 1. It is heavier than air.
2. It doesn't burn and doesn't help in burning.

❺
1. (✓) 2. (✗) ... carbon (coal).
3. (✗) ... percentage of carbon dioxide ...
4. (✗) ... doesn't burn and doesn't help in burning.
5. (✓)

Test yourself 8

❶
1. b. three oxygen
2. d. calcium hydroxide.
3. d. (a), (b) and (c).
4. b. sodium bicarbonate
5. c. (a) and (b).

❷
[A] 1. Because oxygen gas scarcely dissolves in water, while carbon dioxide easily dissolves in water.
2. Because this means that human swallows a big amount of carbon dioxide that causes bone diseases (osteoporosis) and may cause death.

3. Because oxygen gas helps in burning.
[B] 1. Oxygen. 2. Carbon dioxide.

❸
1. 21 – 0.03
2. manganese dioxide – calcium carbonate.
3. oxygen – oxygen.
4. oxy-acetylene – welding and cutting of metals.
5. carbon dioxide – black

❹
[A] 1. They will rust causing damage to the ironware.
2. Carbon dioxide gas is produced.
3. Carbon dioxide gas is produced during fermentation that makes the bread porous and tasty.
[B] 1. (✗) 2. (✗) 3. (✗) 4. (✓)

❺
[A]

Point of comparison	Oxidation	Combustion
Definition :	It is a slow combination (union) between oxygen and element in the presence of moisture (water).	It is a rapid combination (union) between oxygen and element producing heat and light.

[B] 1. It is compressed in iron cylinders to be used in diving.
2. It is used in making soft drinks.

Test yourself 9

❶
1. hot copper – carbon dioxide gas
2. Nitrogen
3. nodular bacteria – protein.
4. 78% – 21% 5. Oxygen – nitrogen
6. Nitrogen

❷
1. (✗) ... two nitrogen atoms. 2. (✓)
3. (✗) ... to absorb carbon dioxide gas ...
4. (✓)
5. (✗) ... downward displacement of water.

❸
1. To remove oxygen gas from air.
2. Because it doesn't help in burning.
3. Because their roots contain nodular bacteria that help legumes to produce protein from the atmospheric nitrogen.

❹
1. remove carbon dioxide gas from air.
2. absorb oxygen gas from air.
3. nitrogen gas.
4. ⓐ Concentrated sodium or potassium hydroxide.
ⓑ Hot copper. ⓒ Nitrogen gas.
5. Carbon dioxide gas is not removed from air, so we can't obtain nitrogen gas only.

❺

Points of comparison	Nitrogen gas	Oxygen gas
1. Percentage in air :	78% of air volume.	21% of air volume.
2. Preparation :	By passing air over concentrated sodium or potassium hydroxide, then hot copper.	By adding hydrogen peroxide over manganese dioxide as a catalyst.

Test yourself 10

❶
1. car tires – lamps.
2. treatment of skin tumors – cooling food.
3. Nitrogen – carbon dioxide
4. stainless steel – gunpowder – electronic devices.

❷
1. a. It is easily soluble in water.
2. a. it is important in respiration process.
3. a. Ammonia 4. d. (a) , (b) and (c).
5. b. nitrogen

❸
[A] 1. Because nitrogen is inactive element.
2. Because nitrogen doesn't help in burning.
[B] 1. It scarcely dissolves in water.

2. It doesn't easily react with a lot of elements as it is inactive element.
3. It is colourless, tasteless and odorless.

❹

Points of comparison	Oxygen gas	Nitrogen gas	Carbon dioxide gas
1. Their properties :	– It scarcely dissolves in water.	– It scarcely dissolves in water.	– It easily dissolves in water.
2. Their uses :	– It is used in respiration.	– It is used in making stainless steel.	– It is used in making soft drinks.

❺

1. Fig. (b) – Fig. (a)
2. a pungent – ammonia
3. – Nitrogen reacts with a lighted magnesium ribbon producing a white substance that reacts with water producing ammonia gas.

3

❶

1. (✗) The nodular bacteria fix nitrogen ....
2. (✗) Nitrogen gas occupies 78% ....

❷

1. Because nitrogen is an inactive element.
2. Because clear limewater turbids when carbon dioxide gas passes through it.

❸

1. Hydrogen peroxide is decomposed into water and oxygen gas in the presence of manganese dioxide.
2. By burning (combustion) of wood, carbon dioxide gas is produced.

❹

1. - Calcium carbonate.
   - Dilute hydrochloric acid.
2. 1. It is used in making bread.
   2. It is used in making soft drinks.
   3. It is used in extinguishing some types of fires.

1 3

❶

1. photosynthesis - 21%
2. stainless steel.
3. oxy-acetylene flame.
4. white substance - ammonia.
5. water - oxygen gas.
6. respiration - combustion (burning).

❷

[A] 1. Because the consumed oxygen gas during respiration and combustion processes is compensated by the green plants during photosynthesis.
2. Because it causes relative constancy of the volume of car tires when the temperature changes.

[B] 1. (✓) 2. (✗) 3. (✓) 4. (✗)

❸

[A] 1. Nitrogen gas.
2. Ozone gas.
3. upward displacement of air.

[B] 1. ① Hydrogen peroxide.
② Manganese dioxide.
③ Oxygen.
2. Because oxygen scarcely dissolves in water.

❹

1. b. soil fertilizers. 2. d. carbon dioxide
3. d. (a) , (b) and (c).
4. b. burning. 5. b. Making dry ice.

❺

[A] 1. The harmful radiations coming from the Sun will reach the Earth and causes harms to living organisms.
2. This causes osteoporosis (bone disease) and may cause death.

[B] 1. hydrogen. 2. liquefied.
3. carbon dioxide.

2 3

❶

1. oxygen - nitrogen
2. oxygen - nitrogen oxide
3. oxygen - nitrogen
4. carbon dioxide gas - oxygen gas.
5. carbon dioxide - nitrogen.

❷

[A] 1. Because oxygen combines with iron forming iron oxide that its mass is higher than that of iron.
2. Due to the formation of ammonia gas which has a very pungent smell.
3. Because green plants use carbon dioxide gas in photosynthesis process to produce food and oxygen which is important for respiration of all living organisms.

[B] 1. Oxygen and nitrogen gasses .....
2. ..... is heavier than air.

❸

1. Water molecule.
2. Oxy-acetylene flame.
3. Global warming phenomenon.
4. Nitrogen gas. 5. Legumes.

❹

[A] 1. Legumes as clover, peas and soybeans can't make proteins.
2. Calcium carbonate is formed which is insoluble in water, so limewater becomes turbid.

[B] 1. Carbon dioxide molecule.
2. Nitrogen gas. 3. Oxygen gas.

❺

Nitrogen gas	Carbon dioxide gas	Oxygen gas
78%	0.03%	21%
White - ammonia	White - black	white - magnesium oxide.

Test yourself 11

❶

1. centeral nervous system - peripheral nervous system.
2. fatty – myelin 3. gray - the cerebral cortex.
4. cerebrum - cerebellum - medulla oblongata.
5. the brain

❷

[A] 1. Because the skull protects the brain.
2. Because it controls the involuntary processes of the body as heartbeats.
3. To connect the neuron's body with the neighbouring neurons forming synapse.

[B] 1. (✗) 2. (✗) 3. (✓) 4. (✗)

❸

[A] 1. They contain the centers of thinking and memory.
2. It keeps the balance of the body during movement.
3. It regulates the involuntary processes in the body as heartbeats.

[B] 1. Neuron. 2. The brain.
3. The two cerebral hemispheres.
4. Axon.

❹

[A] 1. It lies at the back area of the brain below the two cerebral hemispheres.
2. At the outer surface of the two cerebral hemispheres.
3. in front of the cerebellum.
4. Inside the skull.

[B] 1. c. Medulla oblongata. 2. d. nervous

❺

1. ① Dendrites. ② Nucleus.
③ Cytoplasm. ④ Plasma membrane.
⑤ Myelin sheath. ⑥ Axon terminals.
2. nerve - nervous.
3. They are connected to the neighbouring neurons to form synapse.

Test yourself 12

❶
1. d. (b) and (c). 2. a. H
3. d. Spinal cord.
4. a. two cerebral hemispheres. 5. d. 43

❷
[A] 1. The nervous system will be exhausted and cause nervous tension and affect the heartbeats and the sleeping periods.
2. The withdrawal of your hand will occur quickly.
[B] 1. 12 - 31
2. Loss time sensation – sluggishness.
3. gray - white

❸
[A] 1. It is responsible for the reflex actions inside the body.
2. It delivers the sensory information and the kinetic responses between the central nervous system and all parts of the body.
[B] 1. (✗) 2. (✓) 3. (✗)

❹
[A] 1. To protect the spinal cord.
2. Due to the reflex action made by the spinal cord.
[B] 1. Central nervous system.
2. Brain. 3. Cranial nerves.
4. Spinal nerves. 5. Cerebrum.
6. Medulla oblongata.

❺
[A] 1. Reflex action 2. Spinal cord
3. Peripheral nervous system
[B] 1. the spinal cord
2. ⓐ White matter ⓑ Gray matter
[C] 1. Keeping away from sitting for a long periods in front of computer and television.
2. Staying away from tranquilizers and stimulants.

Test yourself 13

❶
1. skull - backbone - ribcage.
2. slightly movable - freely movable
3. axial skeleton - appendicular
4. 12
5. skeletal system - muscular system.

❷
[A] 1. To prevent the friction between vertebrae during motion.
2. To prevent bone diseases such as osteomalacia and rickets.
3. Because the ribcage protects the heart and lungs.
[B] 1. (✓) 2. (✗) 3. (✗) 4. (✓)

❸
[A] 1. It protects the brain.
2. It protects the spinal cord.
3. They allow eating, drinking, writing and holding things.
[B] 1. b 2. a 3. d 4. c

❹
[A]

Points of comparison	Voluntary muscles	Involuntary muscles
1. Definition :	They are the muscles that can move willingly and you can control their movement.	They are the muscles that can move automatically and you can't control their movement.
2. Example :	Face muscles.	Bladder muscles.

[B] 1. femur. 2. vertebral column.
3. knee joint. 4. Ribcage.

❺
[A] 1. bones of lower limbs.
2. ① Femur. ② Shaft bones.
③ Foot bones.
[B] 1. Avoid carrying heavy things that exceed your ability.
2. Exercising regularly.
3. Exposing the body to sunlight for suitable periods.

4

❶
1. a. nerve cell axon. 2. c. spinal cord.
3. a. two bones. 4. a. Tendons.
5. a. immovable.

❷
1. Neuron. 2. Spinal cord.
3. Reflex action.
4. Appendicular skeleton.

❸
1. In front of the cerebellum in the brain.
2. Inside the spinal cord.
3. At the back area of the brain below the two cerebral hemispheres.
4. In a channel within a series of vertebrae in the backbone.

❹
1. They fix muscles to bones.
2. It keeps the balance of the body during movement.
3. They allow the movement between bones.
4. - They control the voluntary movements of the body.
- They receive nerve impulses from the sense organs and send the suitable responses to these impulses.
- They contain the centers of thinking and memory.
5. - It protects the heart and the lungs.
- It helps in the inhalation and the exhalation processes.

❺
1. Due to the reflex action made by the spinal cord.
2. Because muscles generate the mechanical energy that moves your body.
3. Because medulla oblongata controls all the involuntary processes such as heartbeats.

1 4

❶
1. Cerebum - Cerebellum - medulla oblongata
2. 33 – spinal cord.
3. gray matter - white matter.
4. 10
5. the central nervous system - the peripheral nervous system.

❷
1. d. (a) , (b) and (c) 2. d. (a) and (c)
3. a. stay away from tranquilizers.
4. b. 12 pairs of cranial nerves and 31 pairs of spinal nerves.
5. b. Spinal cord.

❸
[A] 1. Cerebellum - keeping the balance of the body during movement.
[B] 1. The axon.
2. Slightly movable joints.

❹
1. Fig. (a) : The skeletal system.
Fig. (b) : The muscular system
2. axial – appendicular.
3. It protects the lungs and the heart and helping in inhalation and exhalation processes.
4. the brain
5. humerus, forearm and hand bones

❺
[A] 1. The body can't bend in different directions and there is no protection to the spinal cord.
2. The withdrawal of your hand will occur quickly.
[B] 1. (✗) 2. (✗) 3. (✗)

Model Exam 2 on Unit 4

❶
1. The cell body - the axon.
2. 12 - 31

3. the skull - the backbone.
4. cerebral cortex.
5. cartilages - vertebrae.
6. skeletal.

2

[A] 1. All the involuntary processes of the body such as heartbeats will be disturbed and causes death.
2. Muscles are not fixed with bones, so the body cannot move.

[B] 1. Lower limbs in human .....
2. ..... called axon terminals.
3. ..... are involuntary muscles.

3

[A] 1. Due to the reflex action made by the spinal cord.
2. To provent bone diseases such as osteomalacia and rickets.
3. Because it allows the movement in all directions.

[B] 1. – Spinal cord.
– Structure of the brain.
2. – Skull.
– bones of lower limbs.

4

1. Freely movable joints.
2. The brain.
3. Spinal cord. 4. Joints.
5. Medulla oblongata.

5

[A]

Points of comperison	Cranial nerves	Spinal nerves
Definition :	They are nerves that emerge from the brain.	They are nerves that emerge from the spinal cord.
Number :	12 pairs.	31 pairs.

[B] 1. Mumerus. 2. Forearm.
3. Hand.

PART THREE

Guide Answers of Final Exams

PART 2

Final Revision

Unit One : Force and Motion.
Unit Two : Thermal Energy.
Unit Three : The Atmosphere.
Unit Four : Structure and Function.

Final Revision on Unit 1

1 Definitions

Item	Definition
1. Mass :	It is the amount of matter in an object.
2. Gram (gm) :	It is one of the measuring units of mass that nearly equals the mass of one paper clip.
3. Kilogram (kg) :	It is one of the measuring units of mass that equals the mass of one liter of distilled water.
4. Weight :	It is the force by which a body is attracted to the Earth. It is the gravitational force by which a body is attracted to the Earth.
5. Newton :	It is the measuring unit of weight and it is almost equal to the weight of an object on the Earth's surface whose mass is 100 grams.

2 Importance or use

Item	Importance or use
1. Gram (gm) :	It is a unit used to measure small masses such as jewellery.
2. Kilogram (kg) :	It is a unit used to measure large masses as fruits and vegetables.
3. Balance scale and one-arm scale with a pointer :	It is a device that is used to measure the large masses as cheese and vegetables.
4. Sensitive two-arms scale and one-arm digital scale :	It is a device that is used to measure small masses as gold and chemicals.
5. Spring scale :	It is a device that is used to measure the weight of any object.
6. The Earth's gravity :	It attracts all the objects towards the center of the Earth.

3 Give reasons for

1. The mass of a body on the Earth's surface equals the mass of the same body on the moon's surface.
Because the mass of the body is a fixed value and it doesn't change by changing the place.

2. Object's falling downward the Earth.
Due to the effect of weight (gravitational force).

3. The balance scale should be placed horizontally on a stable shelf.
To avoid any vibration for the balance scale.

4. The force of the moon's gravity is less than the Earth's gravity.
Because the mass of the moon is less than the mass of the Earth, so the gravity of the moon is less than that of the Earth.

5. The weight of a person on the Earth's surface is larger than that on the moon's surface.
Because the Earth has greater mass and gravitational force than the moon.

6. The weight of a body in a flying balloon is smaller than that on Earth's surface.
Because the gravitational force of the Earth to the person in the balloon decreases as we go away from the center of the Earth.

7. The weight of an object changes according to the planet that the object exists on.
Because the gravity of a planet depends on its mass, so the weight of any object will change from a planet to another.

8. The wire of spring scale expands when a body is hanged to it.
Because the gravitational force of the Earth attracts the hanged body downward, that causes the expand of the wire of spring scale.

4 What happens when

1. You hang a body in the bottom hook of the spring scale.
The body pulls the wire of the spring downwards and the reading of the pointer increases.

2. The mass of an object increases.
Its weight increases.

3. The mass of an object decreases to half.
The weight of this object decreases to half.

4. The mass of the planet where the object exists increases.
The weight of this object increases.

5. There is no gravity on the Earth's surface.
All objects on the Earth's surface don't have weight.

6. You measure the weight of a toy car on the Earth's surface, then measure its weight on the moon's surface.
The weight of the toy car on the Earth's surface equals 6 times its weight on the moon's surface.

7. The distance between a person in a balloon and the center of the Earth increases.
The weight of the person decreases as the gravitational force of the Earth for this person decreases.

PART 2

8. Transfering a body of 60 Newton weight from the Earth's surface to the moon's surface.

The weight of the body decreases to 10 Newton.

5 Comparisons

1. Between balance scale and sensitive two-arms scale.

Points of comparison	Balance scale	Sensitive two-arms scale
- Its type :	Two-arms scale.	Two-arms scale.
- Its use :	It is used to measure the large masses as cheese and vegetables.	It is used to measure the small masses as gold and chemicals.

2. Between mass and weight.

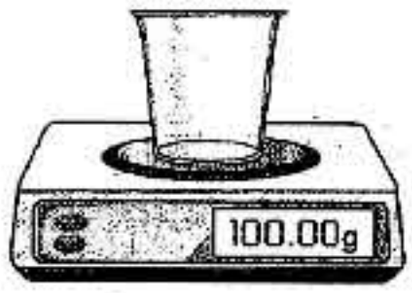
Points of comparison	Mass	Weight
- Definition :	The amount of matter in an object.	The gravitational force by which the body is attracted to the Earth.
- Measuring unit :	Kilogram or gram.	Newton.
- Measuring device :	Balance scale – Sensitive two arms scale – one arm digital scale – one arm scale with a pointer	Spring scale.
- The direction of its effect :	It has no direction.	Its effect is always directed towards the center of the Earth (downward).
- The effect of changing the place :	Constant. (It does not change with changing the place).	Variable (It changes with changing the place).

3. The balance scale and the spring scale.

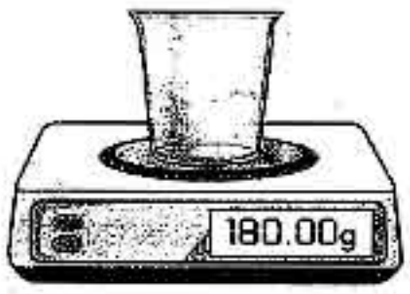
Point of comparison	Balance scale	Spring scale
Use :	It is a device that is used to measure the mass of object.	It is a device that is used to measure the weight of object.

Activities

Activity 1 To know how to measure the mass of a liquid by a digital scale :



digital scale



Steps:

1. Bring an empty beaker and record its mass by using the digital scale (M_1).
2. Put an amount of liquid (that needed to be measured) in the beaker, then record the total mass (M_2).
3. Subtract M_1 from M_2 to obtain the mass of the liquid only.

Observation & Conclusion:

The mass of liquid = The mass of the beaker with liquid (M_2) – the mass of the empty beaker (M_1).

Activity 2 To know how to measure the weight of any object by the spring scale :

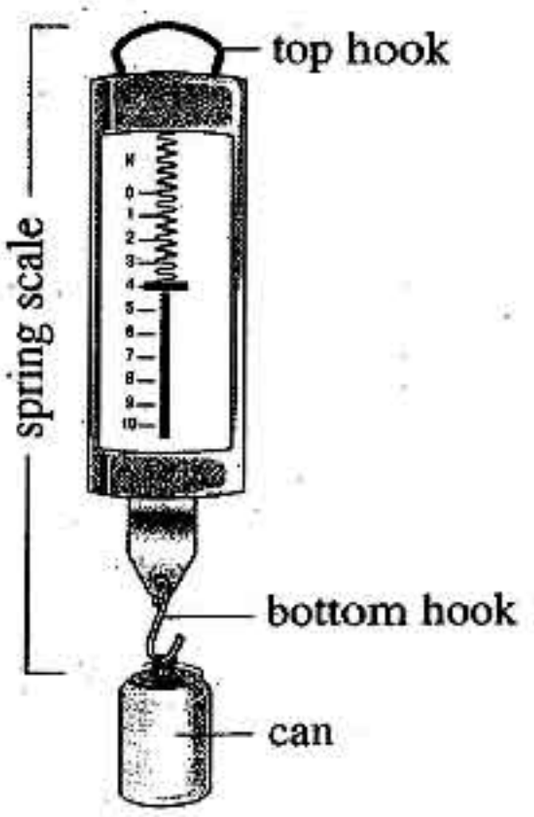
Steps:

1. Hold the spring scale from its top hook , then hang the body (as a can) in its bottom hook.
2. Let the object go down slowly.

Observation:

The can pulls the spring downwards and the reading of the pointer increases.

3. Wait until the object becomes stable to record the reading which refers to the object's weight.



Conclusion:

The weight of any object can be measured by the spring scale by **determining the extension of its spring.**

PART 2

7 Important laws and solved problems

1. **Object's weight on the Earth's surface (Newton) = its mass (kg.) × 10**

2. **Mass of any object on the Earth's surface = Mass of the same object on the moon's surface.**

3. **Object's weight on the moon (Newton) = its weight on the Earth (Newton) × $\frac{1}{6}$**

Example : If the object's mass = 60 kg on the Earth, calculate :

(a) **Its mass on the moon's surface.**

(b) **Its weight on the Earth's surface.**

(c) **Its weight on the moon's surface.**

Answer :

(a) Its mass on the moon's surface = Its mass on the Earth's surface = 60 kg.

(b) Its weight on the Earth's surface = Its mass × 10 = 60 × 10 = 600 Newton.

(c) Its weight on the moon's surface = its weight on Earth's surface × $\frac{1}{6}$

$= 600 \times \frac{1}{6} = 100$ Newton.

8 Important Points

- The types of scales are **two-arms scale** and **one-arm scale**.
- Two-arms scale is divided into **balance scale** and **sensitive two-arms scale**, while one-arm scale is divided into **one-arm digital scale** and **one-arm scale with a pointer**.
- **The weight of any object is affected by three factors which are :**

1. **The object's mass, where :**
   Weight of any object **increases** by **increasing** its mass.
2. **The planet (place), where the object exists :**
   When the mass of the planet **increases** , its gravitational force for an object **increases** , so the weight of the object **increases**.
3. **The distance between the object and the center of the planet , where :**
   The weight of any body **decreases** when the distance between the body and the center of the planet **increases** as the gravitational force **decreases**.

Final Revision on Unit 2

1 Definitions

Item	Definition
1. Heat energy:	It is a form of energy that transfers from the higher temperature object to the lower temperature object.
2. Temperature :	It is the degree of hotness or coldness of a body.
3. Heat conductors :	They are the materials that let heat flow through.
4. Heat insulators :	They are the materials that do not let heat flow through.
5. Thermometer :	It is a device that is used to measure the temperature.
6. Medical thermometer :	It is the thermometer that is used to measure the temperature of the human being.
7. Celsius thermometer :	It is the thermometer that is used to measure the temperature of liquids.
8. Zero °C :	It is the melting point of ice or the freezing point of water.
9. 100 °C :	It is the boiling point of water.

2 Importance or use

Item	Importance or use
1. Heat energy (Thermal energy) :	1. It is important in our daily life in : a. Warming houses. b. Cooking. c. Heating water. d. Drying washed clothes. 2. It has many usages in industry as it is used in making and processing food, glass, paper, textiles, ...
2. Air :	It is used as a heat insulating material in making the insulating glass windows.
3. Aluminium, copper and stainless steel (good conductors of heat) :	They are used in making : a. Cooking pots. b. Kettles that are used in houses and factories.
4. Plastic and wood (bad conductors of heat) :	They are used in making the handles of : a. Cooking pots (utensils). b. Electric iron. c. Kettles.

PART 2

5. Wool (bad conductor of heat) :	It is used in making : a. Heavy blankets. b. Woolen clothes.
6. Thermometers :	They are used to measure the temperature.
7. Medical thermometer :	It is used to measure the human body temperature.
8. Celsius thermometer :	It is used to measure the temperature of liquids.
9. The constriction in the medical thermometer :	It prevents mercury from returning back to the bulb quickly in order to read the measurement easily.
10. Ethyl alcohol :	It is used to sterilize the medical thermometer.
11. Mercury in thermometers :	It expands and contracts regularly according to the change in temperature, in order to determine the temperature of objects.

3 Give reasons for

1. Heat is an important form of energy in our daily life.
Because it is used in :
a. Warming houses. b. Cooking.
c. Heating water. d. Drying washed clothes.

2. Heat has countless usages in industry.
Because it is used in making and processing food, glass, paper and textiles.

3. Copper, iron and aluminium are good conductors of heat.
Because they allow heat to flow through.

4. Wood, glass, plastic and paper are bad conductors of heat (insulators).
Because they don't allow heat to flow through.

5. Wood is a heat insulator, while copper is a heat conductor.
Because wood doesn't let heat flow through, while copper allows heat to flow through.

6. In the insulating glass window, there is a space filled with air between the two glass sheets.
To prevent the leakage of heat.

7. Leaving spaces between the railway bars.
To avoid train accidents where, iron is a good heat conductor that expands and twists by heat.

8. **Plastic differs from copper in conducting heat.**
   Because plastic doesn't let heat flow through, while copper lets heat flow through.

9. **Copper differs from iron and aluminium in conducting heat.**
   Because copper conducts heat faster than aluminium and iron.

10. **Cooking utensils are made of copper, aluminium or stainless steel.**
    To allow heat to flow through as they are good conductors of heat.

11. **The handles of cooking utensils (pots) or kettles are made of plastic or wood.**
    Because they don't let heat flow through as they are bad conductors of heat.

12. **Aluminium, copper and stainless steel are very important heat conductors.**
    Because they are used in making cooking pots (utensils) and kettles that are used in houses and factories.

13. **The handle of electric iron is made of plastic.**
    Because plastic doesn't let heat flow through as it is a bad conductor of heat (insulator).

14. • **We use the heat insulators as wool in making heavy blankets and woolen clothes.**
    • **It is necessary to wear woolen clothes in winter.**
    To keep our bodies warm as they prevent the leakage of heat.

15. **Cooking pots are made of aluminium, while their handles are made of plastic or wood.**
    Because aluminium is a good conductor of heat, while plastic and wood are bad conductors of heat.

16. **We can't measure the temperature of objects by touching.**
    Because the sense of touching helps us to know if the object is hot or cold only, but it can't measure the temperature accurately.

17. **There is a constriction in the medical thermometer.**
    To prevent mercury from returning back to the mercury bulb quickly in order to read the measurement easily.

18. **The medical thermometer must be put in ethyl alcohol before using.**
    To sterilize the medical thermometer before using.

19. **We must shake the medical thermometer well before using.**
    To force the mercury back to the mercury bulb.

20. **The thermometer must be kept out the reach of children.**
    Because mercury inside the thermometer is a toxic substance.

PART 2

21. **The medical thermometer can't measure the temperature of iced water.**
Because the scale of the medical thermometer ranges from 35°C to 42 °C and the temperature of iced water is zero °C.

22. • **We can't measure the boiling point of water by using the medical thermometer.**
• **Boiling water is not used to sterilize the medical thermometer.**
Because the scale of the medical thermometer ranges from 35°C to 42°C and the boiling point of water is 100°C, so the thermometer will be broken.

23. **Mercury is used in making thermometers.**
Because mercury :
a. is a liquid metal that can be seen easily through the thermometer glass.
b. is a good conductor of heat.
c. is a regular expanding material.
d. doesn't stick to the walls of the capillary tube.
e. gives a wide range to temperature measurement.

24. **Mercury gives wide range to measure the temperature.**
Because it remains in liquid state between (-39°C) and (357°C).

25. **The idea of making thermometers depends on changing the volume of liquid by changing temperature.**
Because liquid expands by heating and contracts by cooling.

26. **You feel cold when touching a piece of ice.**
Because the temperature of my hand is higher than that of ice, so heat transfers from my hand to the piece of ice and I feel cold.

What happens when...?

1. **You touch a hot cup of tea.**
I feel hot due to the transfer of heat from the hot cup of tea to my hand.
2. **You hold a piece of ice in your hand.**
I feel cold due to the transfer of heat from my hand to the piece of ice.
3. **You touch one end of a copper rod, where the other end is exposed to a flame of a candle.**
I feel hot, because copper is a good conductor of heat.
4. **You touch the end of a glass rod, where the other end is exposed to a flame of a candle.**
I don't feel hot, because glass is a bad conductor of heat.
5. **Two bodies have the same temperature touch each other.**
Heat doesn't transfer from one body to the other as they have the same temperature.
6. **There are no spaces between the railway bars.**
Train accidents will occur.
7. **The handles of kettles and cooking utensils are made of stainless steel.**
We can't hold them with our hands as stainless steel is a good conductor of heat.

8. All substances, that the man uses are good conductors of heat.
We can't make handles of cooking pots and also we can't make heavy clothes that keep us warm in winter.

9. A medical thermometer is put in boiled water.
The medical thermometer will be damaged, because the boiling point of water is 100°C.

10. There is no constriction above the mercury bulb in the medical thermometer.
The mercury will return back quickly to the mercury bulb before determining the temperature reading.

11. Water is used instead of mercury in making thermometers.
The thermometer can't measure the temperature, because water is not a regular expanding material.

12. We don't shake the medical thermometer well before use.
We can't measure the temperature accurately.

13. The medical thermometer is not sterilized before use.
We may be infected with some diseases.

14. Increasing the temperature of mercury.
Mercury will expand regularly.

5 Comparisons

1. Between heat conductors and heat insulators.

Points of comparison	Heat conductors	Heat insulators
1. Definition :	They are materials that let heat flow through.	They are materials that don't let heat flow through.
2. Examples :	Copper , aluminium , iron and stainless steel.	Glass, wood, paper, plastic, wool, air, liquids and rubber.
3. Uses :	They are used in making : 1. Cooking pans (utensils). 2. Kettles (boilers).	They are used in making : 1. The handles of : - Cooking utensils. - Electric iron. - Kettles. 2. Heavy blankets and woolen clothes.

PART 2

2. Between Celsius thermometer and medical thermometer.

Points of comparison	Celsius thermometer	Medical thermometer
1. Structure :	a. Transparent thick glass tube. b. Very thin capillary tube. c. Mercury bulb that is filled with mercury.	
2. Range of scale :	From 0°C to 100°C.	From 35°C to 42°C.
3. Constriction :	Absent.	Present.
4. The used liquid :	Mercury.	Mercury.
5. Usage :	It is used to measure the temperature of liquids.	It is used to measure the temperature of the human body.

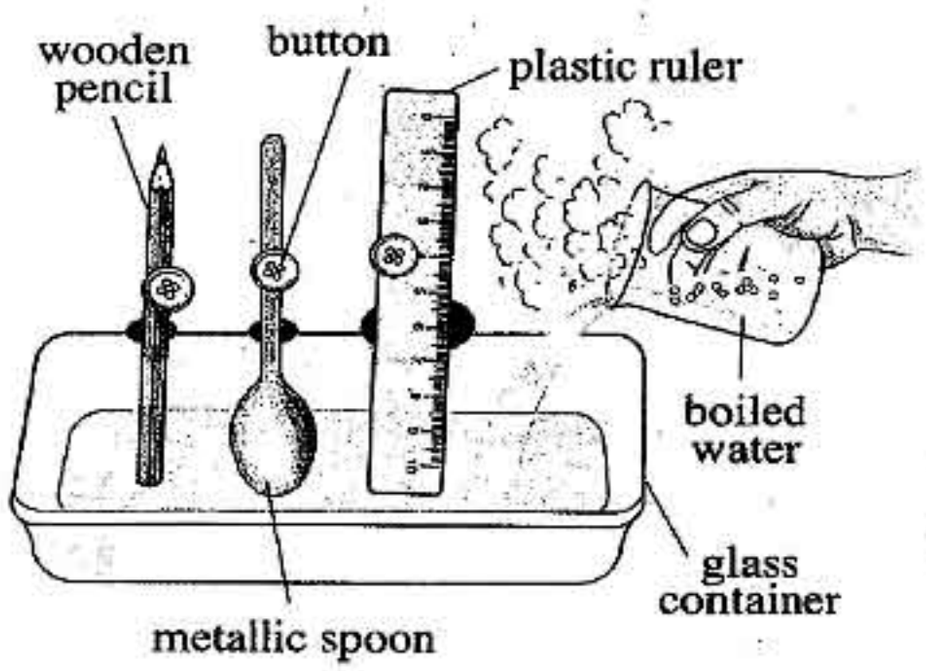
Activities

Activity 1 To show the ability of elements to conduct heat.

A

Steps:

1. Stick a button on a ruler , a spoon and a pencil using molten wax , then fix them. at one edge of the container using clay.
2. Pour boiled water in the container to be half filled.



Observation:

The button falls from the metallic spoon.

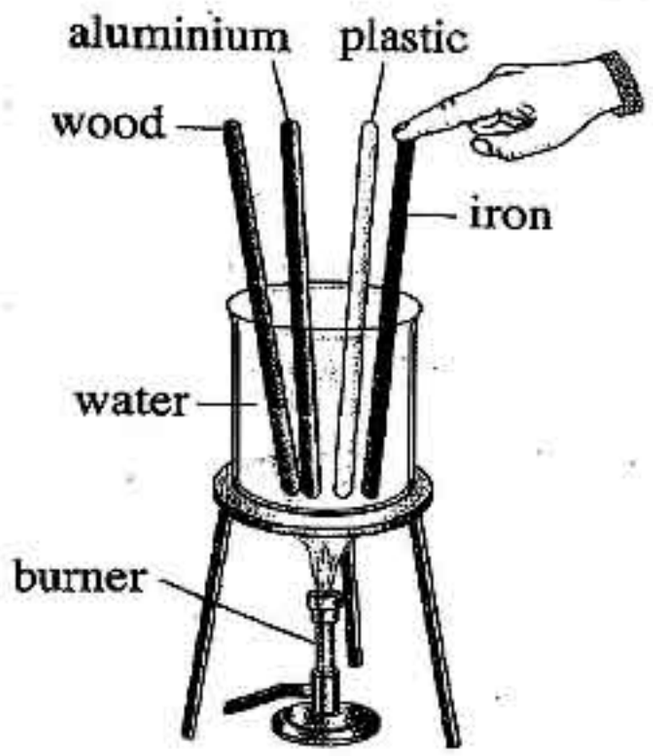
Conclusions:

1. Materials are different in conducting heat.
2. Materials can be classified into heat conductors and heat insulators.

B

Steps:

1. Bring four rods nearly equal in length and thickness from wood, aluminium, plastic and iron.
2. Put the beaker containing water on the flame.
3. Put the four rods inside the hot water.
4. Touch the end of each rod with your finger.



Observation:

1. You feel hot when touching aluminium and iron rods.
2. You don't feel hot when touching wood and plastic rods.

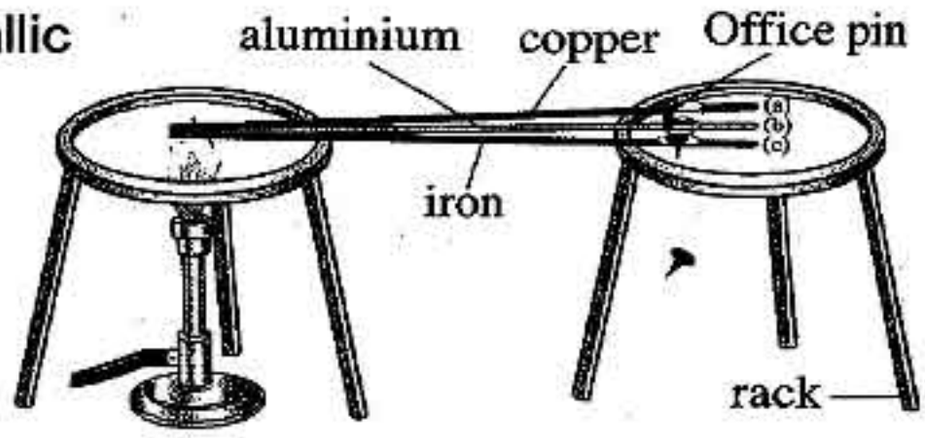
Conclusions:

1. Materials are different in conducting heat.
2. Materials can be classified into heat conductors and heat insulators.

Activity 2 To show that metals are different in conducting heat.

Steps:

1. Stick an office pin on one tip of each metallic rod (a , b , c) using molten wax.
2. Put the three metallic rods on the two racks as shown in the figure.



Observation:

The pin (a) falls first , then the pin (b) and at the end the pin (c).

Conclusion:

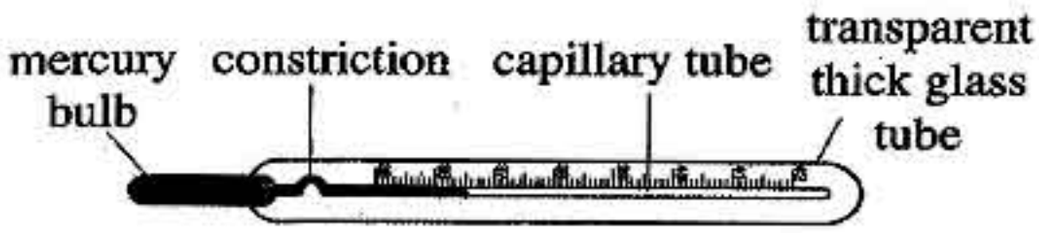
The different metals differ in conducting heat.

, Where :

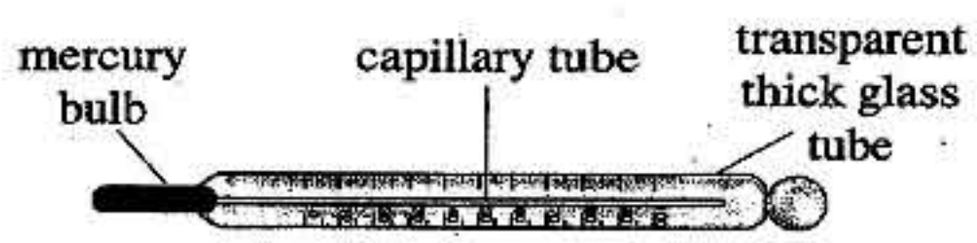
- Copper conducts heat faster than aluminium.
- Aluminium conducts heat faster than iron.

PART 2

7 Important devices



Medical thermometer



Celsius thermometer

8 Important points

- Materials are divided according to the conductivity of heat into **good conductors** of heat (heat conductors) and **bad conductors** of heat (or heat insulators).
- **Copper, iron, stainless steel** and **aluminium** are good conductors of heat.
- **Wood, glass, plastic, rubber, paper, liquids, wool** and **gases** especially air **are** bad conductors of heat.
- All metals are good conductors of heat.
- Metals are different in conducting heat, which means that some metals conduct heat faster than the other.
- Copper conducts heat faster than aluminium, while aluminium conducts heat faster than iron.
- In medical thermometer, each degree is divided into 10 parts, so each part equals $\frac{1}{10}$ degree.
- In Celsius thermometer, the distance between **zero°C** and **100°C** is divided into **100 parts,** where each part equals one degree.

- How to use the medical thermometer to measure your body temperature ?

1. Sterilize the medical thermometer using ethyl alcohol.
2. Dry the thermometer very well using a tissue paper.
3. Shake the thermometer well until the mercury returning back to the bulb.
4. Put the thermometer under your tongue for a minute.
5. Get the thermometer out from your mouth, then record the temperature reading.
6. Sterilize the thermometer using ethyl alcohol and put it in its box.

- Don't seize the medical thermometer firmly with your teeth in order not to be broken because mercury is a toxic substance.
- The normal temperature of the healthy person **is 37°C.**
- While recording the temperature, the Celsius thermometer must be **vertical** and the direction of sight must be **perpendicular** to the thermometer.
- The Swedish scientist "Anders Celsius" created the Celsius scale in 1742.
- Mercury remains liquid between two degrees temperature which are (– 39°C) and (357°C) and this gives a wide range to temperature measurement.

Final Revision on Unit 3

1 Definitions

Item	Definition
1. The atmosphere :	It is a mixture of different gases surrounding the Earth.
2. Catalyst :	A chemical substance that remains without any change in its quantity and structure during the chemical reaction.
3. Ozone :	A gas that its molecule is composed of three oxygen atoms.
4. Oxidation :	It is a slow combination between oxygen and element in the presence of moisture (water).
5. Burning (combustion) :	It is a rapid combination (union) between oxygen and element producing heat and light.

2 Importance or use

Item	Importance or use
1. The atmosphere :	1. It protects the Earth by absorbing ultraviolet radiation coming from outer space. 2. It adjusts the temperature of the Earth's surface.
2. Hydrogen peroxide :	It is used to prepare oxygen, where it dissociates in the presence of manganese dioxide into oxygen and water.
3. Oxygen :	1. It is important for all living organisms as it is used in : - Respiration and combustion of food inside living cells to produce energy necessary for all vital processes. - Formation of water that is composed of one oxygen atom combines with two hydrogen atoms. 2. It forms ozone layer (O_3) that protects the Earth from harmful radiation that come from the Sun. 3. It is compressed in iron cylinders to be used : - In mechanical ventilation for patients who suffer from breathing difficulties. - During surgeries. - During diving and climbing mountains. 4. It combines with acetylene gas to produce oxy-acetylene flame which is used in cutting and welding metals.

4. Limewater :	It is used to detect the presence of carbon dioxide gas.
5. Carbon dioxide :	1. It is used in making dry ice which is used in refrigeration. 2. It is used in extinguishing fires. 3. It is used in making soft drinks. 4. It is used in making bubbled and tasty bread when adding yeast to dough. 5. It is necessary for photosynthesis process of green plants to produce food and oxygen gas.
6. Soil bacteria :	They take the atmospheric nitrogen and convert it into protein.

3 Give reasons for

1. **Although oxygen is consumed during respiration, its percentage remains stable in the atmosphere.**
   Because the consumed oxygen gas during respiration and combustion processes is compensated by the green plants during photosynthesis process.

2. **Although smoke and dust particles in the atmosphere are considered air pollutants, they have an important role in the formation of rains and snow.**
   Because they help in the condensation of water vapour in air and falling rains or snow.

3. **The atmosphere has a great importance for the continuity of life on the Earth.**
   Because the atmosphere :
   - Absorbs ultraviolet radiations coming from outer space.
   - Adjusts the temperature of the Earth's surface.

4. **Oxygen is collected by downward displacement of water.**
   Because oxygen scarcely dissolves in water.

5. **Manganese dioxide remains without any change in its quantity and structure during the preparation of oxygen.**
   Because it acts in this reaction as a catalyst.

6. **Manganese dioxide acts as a catalyst during the preparation of oxygen.**
   Because it remains without any change in its quantity and structure during the reaction.

PART 2

7. **When you turn a cylinder filled with oxygen over another cylinder filled with air, oxygen gas replaces air in the lower cylinder.**
   Because oxygen is heavier than air.

8. **A burning match is still burning when it is placed in a cylinder filled with oxygen.**
   Because oxygen helps in burning.

9. **When you burn a ball of cleansing wire strongly , its mass increases.**
   Because oxygen combines with iron (cleansing wire) forming iron oxide that its mass is higher than that of iron.

10. **Rusting of iron has many disadvantages.**
    Because it causes corrosion and damage of ironware such as bridges' pillars.

11. **Iron nails rust when exposed to moist air.**
    Because iron combines with oxygen of air in the presence of moisture (water) forming a layer of rust that causes corrosion.

12. **Oxygen cylinders are used during climbing mountains.**
    Because the ratio of oxygen gas decreases when we rise above the Earth's surface.

13. **Oxy-acetylene flame is used for cutting and welding metals.**
    Because the temperature of oxy-acetylene flame reaches 3500°C which is sufficient to cut or weld metals.

14. **Ozone layer is very important for the life of all living organisms.**
    Because it protects the Earth from harmful radiations that come from the Sun.

15. **Divers use oxygen cylinders during diving under the water surface.**
    Because oxygen gas is necessary for respiration under the water surface.

16. **The pillars of the bridges are isolated from the atmospheric air by paints.**
    To protect them from iron rusting that causes corrosion and damage of the pillars of bridges.

17. **Clear limewater is used to detect the presence of carbon dioxide gas.**
    Because clear limewater turns into milky when carbon dioxide gas passes through it.

18. Carbon dioxide gas is collected by upward displacement of air.

Because it is heavier than air.

19. Carbon dioxide gas is not collected by downward displacement of water.

Because it easily dissolves in water.

20. Clear limewater gets turbid if carbon dioxide gas passes through it.

Due to the formation of calcium carbonate (white ppt.) which is insoluble in water and causes the turbidity of limewater.

21. It is danger to increase the percentage of CO_2 in air.

Because it causes :

- Suffocation of living organisms.
- Global warming.

22. Burning a magnesium ribbon in the presence of carbon dioxide gas produces white and black substances.

Because it produces magnesium oxide which is a white substance and carbon (coal) which is a black substance.

23. Decreasing the green areas is harmful.

Because this increases the percentage of carbon dioxide gas.

24. Carbon dioxide is used in extinguishing fires.

Because it doesn't burn and doesn't help in burning.

25. Yeast is added to dough on making bread.

Because yeast produces carbon dioxide during fermentation which expands by heat making the bread porous and tasty.

26. Photosynthesis process is important for plants and all living organisms.

Because during photosynthesis process , the plant produces food and oxygen which is necessary for respiration of all living organisms.

27. The environment suffers from increasing the percentage of carbon dioxide gas in recent years.

Due to :

- Burning a large amount of fuel in factories and means of transport.
- The removal of forests.

PART 2

28. The removal of forests leads to the increase in the percentage of carbon dioxide gas in nature.

Because plants take carbon dioxide gas to make their own food by photosynthesis process.

29. Carbon dioxide gas has a great importance for the continuity of life on the Earth.

Because green plants use carbon dioxide gas in photosynthesis process to produce its own food and oxygen gas which is important for respiration of all living organisms.

30. Carbon dioxide gas has many benefits.

Because it is used in :

- Making dry ice, soft drinks and bread.
- Photosynthesis process.
- Extinguishing fires.

31. • Nitrogen contributes in the composition of all living tissues.

• Nitrogen is very important in the human's life.

Because it forms protein which is necessary for building up living tissues.

32. Nitrogen is very important for legumes.

Because legumes need nitrogen gas to form protein by the help of special type of bacteria (nodular bacteria) that live in their roots.

33. Nitrogen is called azote which means lifeless.

Because nitrogen gas doesn't help in burning.

34. The main source to prepare nitrogen is the air.

Because nitrogen forms 78% of the volume of atmospheric air.

4 What happens when...?

1. There is no the atmosphere.

The ultraviolet radiations will reach the Earth from the outer space, so the temperature of the Earth will be variable.

2. There is no oxygen in the atmosphere.

Living organisms cannot respire, so they will die.

3. Leaving iron nails in moist air for a long time.

Iron will combine with oxygen in the presence of moisture (water), so iron nails will rust.

4. Ozone layer is decayed.

The harmful radiations coming from the Sun will reach the Earth and cause harms to living organisms.

5. The percentage of oxygen gas in air is more than 21%

We cannot control burning processes as oxygen helps in burning.

6. A lighted magnesium ribbon is placed in a jar filled with oxygen.

Magnesium oxide which is white matter is formed.

7. The percentage of oxygen gas decreases in the atmosphere.

The living organsims can't respire and the combustion process doesn't occur.

8. Putting a burning fragment in a cylinder filled with oxygen.

The burning fragment is still burning.

9. The mass of cleansing wire befor and after heating.

Its mass increases after burning due to the combination with oxygen.

10. Hydrogen peroxide is dropped over manganese dioxide.

Hydrogen peroxide is decomposed into water and oxygen gas, while manganese dioxide doesn't change in its quantity or structure.

11. The bridges' pillars are not isolated with paints.

They will rust causing damage to the bridges.

12. One carbon atom linked with two oxygen atoms.

A molecule of carbon dioxide will be formed.

13. The percentage of carbon dioxide in air increases.

- The temperature of the Earth will increase.
- The living organisms will suffocate.

14. The percentage of carbon dioxide in air decreases.

Green plants cannot make photosynthesis process, so the percentage of oxygen will decrease in the atmosphere and living organisms will die.

PART 2

15. Most of forests on the Earth are removed.

The percentage of carbon dioxide will increase in air that raises the temperature of the atmosphere and causes suffocation of living organisms.

16. You blow in a jar contains clear limewater.

Limewater turns into milky due to the presence of carbon dioxide in the exhaled air.

17. Dilute hydrochloric acid is dropped over calcium carbonate.

They will react together and carbon dioxide gas will evolve.

18. A lighted candle is put in a cylinder filled with carbon dioxide gas.

The lighted candle will extinguish.

19. A lighted magnesium ribbon is inserted in a cylinder filled with CO_2

Magnesium ribbon keeps burning for a short time producing magnesium oxide which is a white substance and carbon which is a black substance.

20. Lemon juice reacts with sodium bicarbonate.

Carbon dioxide gas is evolved.

21. The pressure on liquefied carbon dioxide is relieved.

Dry ice is formed which is used in refrigeration.

22. Yeast is added to dough on making bread.

Carbon dioxide gas is produced during fermentation, so the bread becomes porous and tasty.

23. Drinking big quantities of soft drinks.

This causes osteoporosis and may cause death.

24. Nitrogen gas is not present in the atmospheric air.

The protein substance that builds up the bodies of all living organisms is not formed.

25. Oxygen reacts with nitrogen during lightning.

Nitrogen oxides are formed, where they reach the soil during rainning.

26. Getting rid of soil bacteria.

Legumes as clover, peas and soybeans can't make protein.

5 Comparisons

1. Compare between oxidation and burning (combustion).

Points of comparison	Oxidation	Burning (combustion)
1. Definition :	It is a slow combination (union) between oxygen and element in the presence of moisture (water).	It is a rapid combination (union) between oxygen and element producing heat and light.
2. Example :	Iron rusting.	Burning a piece of cleansing wire.

2. Compare between oxygen, carbon dioxide and nitrogen.

Points of comparison	Oxygen	Carbon dioxide	Nitrogen
1. Its percentage in air :	21%	0.03%	78%
2. Structure :	Its molecule is composed of two oxygen atoms linked together.	Its molecule is composed of one carbon atom linked with two oxygen atoms.	Its molecule is composed of two nitrogen atoms linked together.
3. Symbol :	O_2	CO_2	N_2
4. Properties :	- It is a colourless, tasteless and odorless gas. - It scarcely dissolves in water. - It doesn't burn, but it helps in burning. - It is heavier than air, so it replaces air. - It combines with a lighted magnesium ribbon forming magnesium oxide (white matter).	- It is a colourless and odorless gas. - It easily dissolves in water. - It doesn't burn and doesn't help in burning so, it is used in extinguishing fires. - It reacts with a magnesium ribbon forming magnesium oxide (white powder) and carbon or coal (black substance) that deposits on the wall of the cylinder. - It is heavier than air, so it is collected by upward displacement of air.	- It is a colourless, tasteless and odorless gas. - It scarcely (hardly) dissolves in water. - It doesn't help in burning.

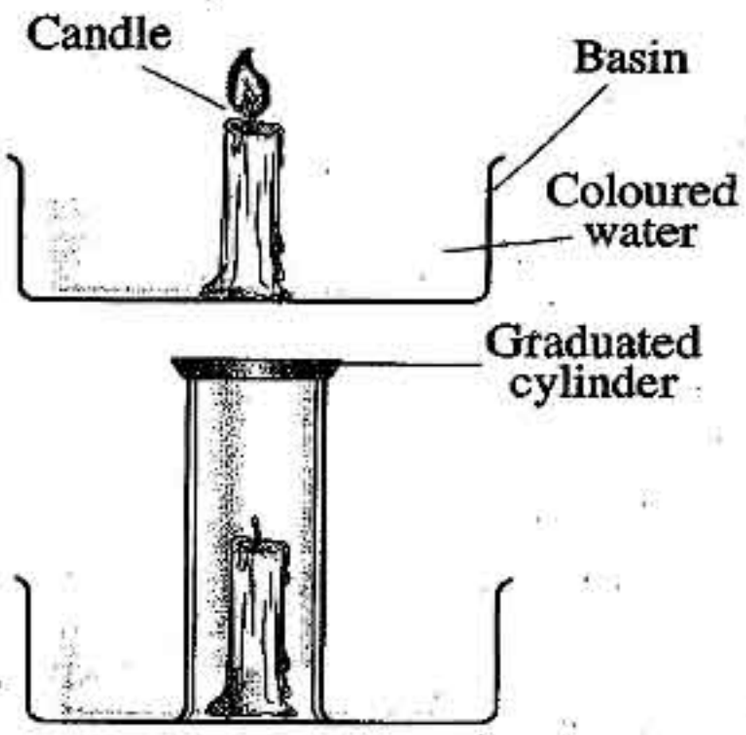
PART 2

Activities

Activity 1 To show that oxygen forms one fifth of the air volume.

Steps:

1. Fix a lighted candle inside a basin containing coloured water.
2. Cover the candle with a graduated cylinder.
3. Determine the level of water inside and outside the cylinder.



Observation:

The lighted candle extinguishes and water rises inside the cylinder with one fifth ($\frac{1}{5}$) of its volume.

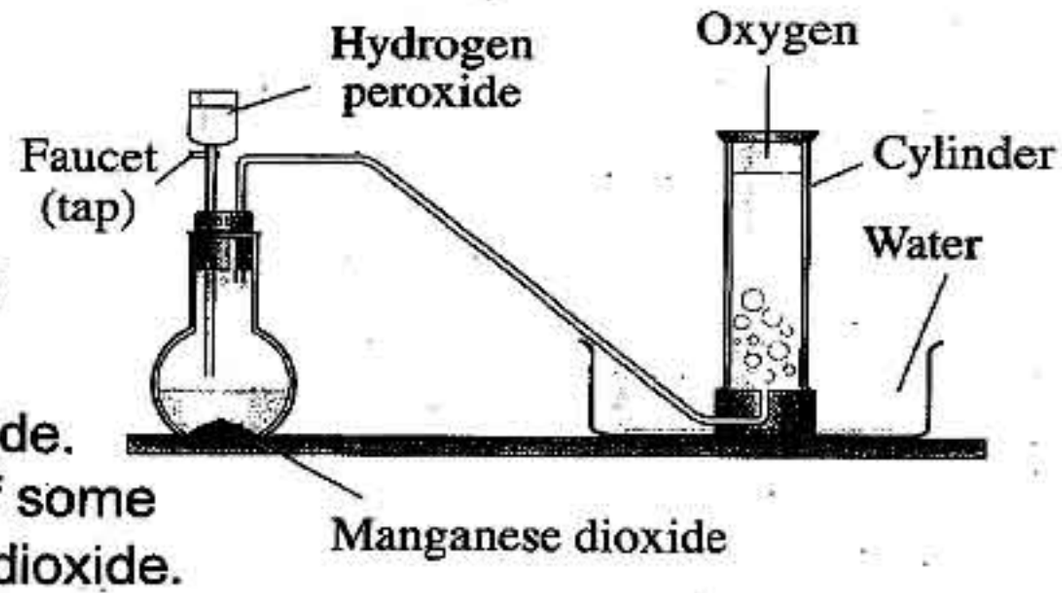
Conclusion:

Oxygen occupies one fifth (21%) of the air volume.

Activity 2 To show the preparation of oxygen in the laboratory.

Steps:

1. Set up the apparatus that shown in the opposite figure.
2. Pour some manganese dioxide in the flask.
3. Fill the funnel with hydrogen peroxide.
4. Open the tap to allow the leaking of some hydrogen peroxide on manganese dioxide.



Observation:

The formation of a gas at the top of the cylinder.

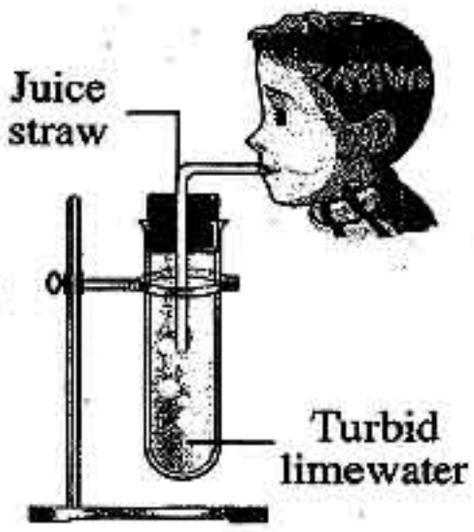
Conclusion:

Hydrogen peroxide dissociates (decomposes) in the presence of manganese dioxide into water and oxygen.

Activity 3 To detect the presence of carbon dioxide gas in the exhaled air.

Steps:

1. Put an amount of clear limewater in a tube.
2. Blow in limewater for two minutes using the juice straw.



Observation:

Limewater becomes turbid (milky).

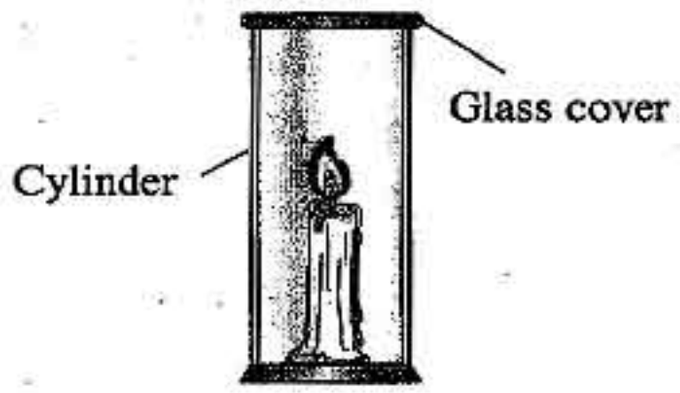
Conclusions:

1. Exhaled air contains carbon dioxide gas.
2. Carbon dioxide gas turbids the clear limewater.

Activity 4 To detect the presence of carbon dioxide during combustion of a candle.

Steps:

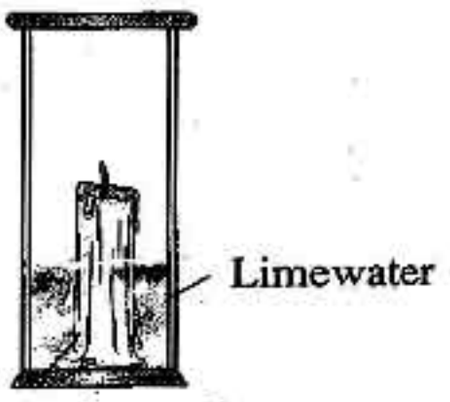
1. Put a lighted candle in a cylinder, then cover the cylinder with a glass cover.



Observation:

After a while, the candle is extinguished.

2. Remove the glass cover and pour a little amount of clear limewater inside the cylinder and cover it again.



Observation:

Limewater turns into milky (turbid).

Conclusion:

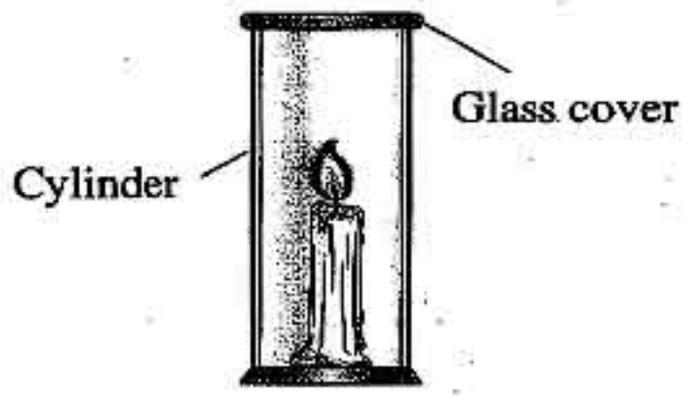
Carbon dioxide gas is produced during the combustion of a candle.

PART 2

Activity 5 To show that carbon dioxide doesn't burn and doesn't help in burning.

Step:

Turn a cylinder filled with CO_2 upside down on a lighted candle.



Observation:

The lighted candle will extinguish.

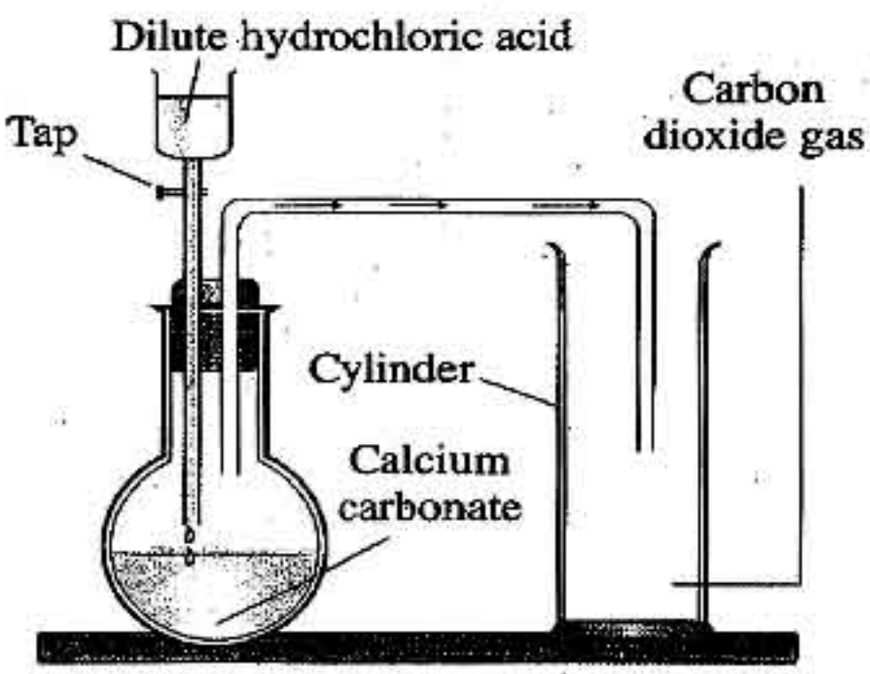
Conclusion:

Carbon dioxide doesn't burn and doesn't help in burning.

Activity 6 To show the preparation of carbon dioxide gas in laboratory.

Steps:

1. Set up the shown apparatus as in the opposite figure.
2. Pour some dilute hydrochloric acid on calcium carbonate that found in the flask.



Observation:

Carbon dioxide gas evolves, then passes in the tube to be collected in the cylinder.

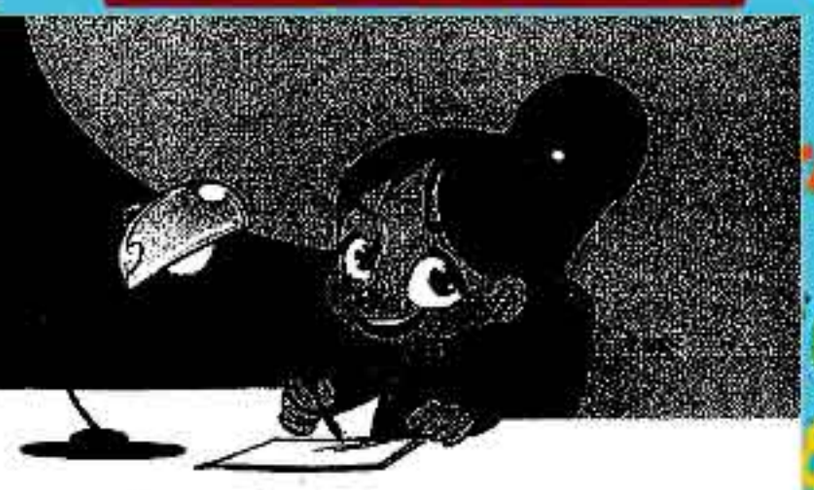
Conclusions:

1. Carbon dioxide gas is prepared by adding dilute hydrochloric acid to calcium carbonate.
2. Carbon dioxide gas is prepared by upward displacement of air not water, because it is heavier than air and easily dissolves in water.

Important points

1. **Carbon dioxide** gas and other gases (such as water vapour, argon, neon, helium and others) represent 1% of the atmosphere.
2. **Hydrogen peroxide** $\xrightarrow[\text{as a catalyst}]{\text{Manganese dioxide}}$ **Water + Oxygen.**
3. **Oxygen** has the ability to combine (unite) directly with most elements forming element oxide.
4. Ironware must be isolated by paints **to protect them from iron rusting**.
5. The mass of materials **increases** after combination with oxygen.
6. Oxygen was discovered in **China in 800 B.C.,** then it was re-discovered by **Joseph Priestley** in August 1774.
7. **Antoine Lavoisier** gave oxygen its name in 1778.
8. **Lemon juice** reacts with sodium bicarbonate to produce carbon dioxide gas.
9. **The atmospheric** air is the main source of nitrogen on the Earth's surface.

Final Revision on Unit 4



1 Definitions

Item	Definition
1. Nervous system :	It is a communication and controlling body system.
2. Nerve cell (neuron) :	It is the building (or basic structure) unit of the nervous system.
3. The axon :	It is a cylindrical axis covered with a fatty layer called myelin sheath.
4. Dendrites :	They are branches extending from the neuron's body.
5. The brain :	It is a nerve block containing millions of nerve cells (neurons) and it is the main control center in the human body.
6. Spinal cord :	It is a cylindrical cord from which the spinal nerves extend.
7. The peripheral nervous system :	It is the nerves which emerge from the central nervous system (the brain and the spinal cord).
8. Cranial nerves :	They are 12 pairs of nerves that emerge from the brain.
9. Spinal nerves :	They are 31 pairs of nerves that emerge from the spinal cord.
10. Reflex action :	It is the automatic (spontaneous) response of the body to different stimuli.
11. Movement :	It is the ability of organism to change its position from one place to another.
12. Skull :	It is a bony box contains cavities for eyes, ears and nose.
13. The joint :	It is the location at which bones meet each other.
14. Immovable joints :	They are joints that don't allow any movement.
15. Slightly movable joints :	They are joints that allow movement in one direction only.
16. Freely movable joints :	They are joints that allow movement in all directions.

2 Importance or use

Item	Use
1. Dendrites :	They are connected to the neighbouring neurons to form synapse.
2. Axon terminals :	They are connected to the muscles or form a synapse with the dendrites of other neurons.
3. Brain :	It directs and coordinates all the processes, ideas, behaviours and emotions.
4. Cerebrum (the two cerebral hemispheres) :	- It controls the voluntary movements of the body such as running in races. - It receives nerve impulses from the sense organs (sensory centers) and sends the suitable responses to these impulses. - It contains the centers of thinking and memory.
5. Cerebellum :	It maintains the balance of the body during the movement.
6. Medulla oblongata :	It is responsible for regulating the involuntary processes of the body as : - Regulating heartbeats. - Regulating the movement of the respiratory system parts during breathing. - Regulating the movements and functions of the digestive system.
7. Spinal cord :	- It delivers the nerve messages from the body organs to the brain and vice versa. - It is responsible for the reflexes.
8. Peripheral nervous system (nerves) :	It delivers the sensory information and the kinetic responses between the central nervous system and all parts of the body.
9. Nervous system :	- It carries the nerve messages (impulses) from one of the body areas to another. - It regulates and coordinates all the vital processes within the body. - It receives the external stimuli that surround the human being through the sensory organs, then identifies and interprets them.

PART 2

10. The skull :	It protects the brain.
11. The backbone :	- It allows the body to bend in different directions. - It protects the spinal cord.
12. Cartilages :	They prevent friction between vertebrae (bone) during movement.
13. The ribcage :	- It protects the lungs and the heart. - It helps in the inhalation and exhalation processes (breathing).
14. Upper limbs :	They allow eating, drinking, writing and holding things.
15. Lower limbs :	They allow walking, running, standing and carrying the rest of the body.
16. The joints :	They allow the movement between bones.

3 Give reasons for

1. Dendrites extend from the neuron's body.

To connect the neuron's body with the neighbouring neurons forming synapse.

2. The axon ends with nerve endings.

To form a synapse with other neurons or to connect with the muscles.

3. Brain is the main control center in the human body.

Because it directs and coordinates all the processes, ideas, behaviours and emotions.

4. The cerebrum helps you to win in races.

Because it controls the voluntary movements as running in races.

5. The medulla oblongata keeps you alive during sleeping.

Because it is responsible for regulating the involuntary processes as :

- Regulating the heartbeats.
- Regulating the movement of the respiratory system parts during breathing.
- Regulating the movements and functions of the digestive system.

6. Cerebrum is a very important part of the brain.

Because it :

- Controls the voluntary movements of the body as running in races.
- Receives nerve impulses from sense organs and sends the suitable responses to these impulses.
- Contains the centers of thinking and memory.

7. Cerebellum has a great importance during the movement of the body.

Because it maintains the balance of the body during its movement.

8. The medulla oblongata helps in digestion.

Because it regulates the movements and functions of the digestive system's organs.

9. The brain is located inside the skull and the spinal cord extends through the inside of the backbone.

Because the skull protects the brain and the backbone protects the spinal cord.

10. Damage of medulla oblongata leads to death.

Because medulla oblongata controls all the involuntary processes (as heartbeats, movement of the respiratory system parts during breathing, movement and functions of the digestive system).

11. • It is important to prevent exhausting the sensory organs.

• You must stay away from the sources of pollution.

• You must sleep a sufficient periods of time.

• It is important not to take sleeping pills without the doctor's prescription.

To maintain the nervous system healthy.

12. You must reduce the intake of the stimulating substances such as tea and coffee.

To maintain the nervous system healthy as they affect the sleeping periods, the heartbeats and lead to nervous tension.

13. The withdrawal of the hand quickly when it suddenly touches a hot surface.

Due to the reflex action made by the spinal cord.

14. The nervous system has a special importance in the human body.

Because :

- It carries the nerve messages from one of the body areas to another.
- It regulates and coordinates all the vital processes within the body.
- It receives the external stimuli that surround the human being through the sensory organs, then identifies and interprets them.

PART 2

15. Addiction passlvely affects on the nervous system.

Because it causes retardation of memory and learning, nervous tension, sluggishness, loss time sensation and sleepless.

16. The movement is very important to living organisms (human).

Because it helps in moving from a place to another seeking for benefit or away from harm.

17. The presence of the brain inside the skull.

To protect the brain.

18. There are cartilages between the vertebrae of the backbone.

To prevent the friction between vertebrae during motion.

19. The backbone is very important.

Because it allows the body to bend in different directions and it protects the spinal cord.

20. The ribcage surrounds both the heart and the lungs.

To protect the heart and the lungs.

21. The knee joint is a slightly movable joint.

Because it allows the movement in one direction only.

22. The thigh joint is a freely movable joint.

Because it allows the movement in all directions.

23. The joints between the bones of the skull are immovable.

Because they don't allow any movement.

What happens when...?

1. The absence of dendrites and axon terminals.

The synapse are not formed.

2. Damage of medulla oblongata.

All the involuntary processes of the body will be disturbed and causes death.

3. The cerebellum is shocked hardly.

The body will lose its balance.

4. • **Your finger gets pricked by the plant thorns.**
   • **Touching a very hot surface.**
   The withdrawal of your hand will occur quickly.

5. **Approaching something to your eye.**
   The blinking of the eyelashes will occur.

6. • **The body doesn't take a sufficient period of rest.**
   • **Sitting for long times in front of the computer.**
   • **Continuous exposure to contaminated air by the factories smoke.**
   • **Human is exposed to noise constantly.**
   The nervous system will be exhausted.

7. **The over intake of stimulants such as tea and coffee.**
   The nervous system will be exhausted as they lead to nervous tension and affect the heartbeats and the sleeping periods.

8. **Taking drugs.**
   It will cause sleepless, nervous tension, sluggishness, retardation of memory and learning.

9. • **All the skeletal system bones are one bone (fused).**
   • **All the bones of the human body are without joints.**
   The human body can't move.

10. **Hib (thigh) joint has a limited movement.**
    The lower limbs will move in one direction only.

11. **The shoulder joints become from the limited movement joints.**
    The two upper limbs will move in one direction only..

12. **The backbone consists of one long bone.**
    The human body can't bend in different directions.

13. **The absence of cartilage between vertebrae of the backbone.**
    Friction takes place between the vertebrae causing harms to the backbone.

PART 2

5 Important tables

1.

The Organ	Its position
1. The brain :	Inside the skull.
2. The two cerebral hemispheres :	In the brain.
3. The cerebellum :	At the back area of the brain below the two cerebral hemispheres.
4. The medulla oblongata :	In the brain exactly in front of the cerebellum.
5. The spinal cord :	In a channel within a series of vertebrae in the backbone.
6. The H-shaped gray matter :	In the inner part of the spinal cord.
7. The cerebral cortex :	At the outer surface of the two cerebral hemispheres.
8. Dendrites :	It extends from the cell body of the neuron.
9. Axon terminals :	At the end of the axon of the neuron.

2.

The joint	Its type
1. Skull joints.	Immovable joints.
2. Knee joint.	Slightly movable joint.
3. Elbow joint.	Slightly movable joint.
4. Shoulder joint.	Freely movable joint.
5. Thigh (hip) joint.	Freely movable joint.
6. Wrist joint.	Freely movable joint.

Comparisons

1. Compare between the brain and the spinal cord.

Points of comparison	The brain	The spinal cord
1. Definition :	It is a nerve block containing millions of nerve cells and it is the main control center in the human body.	It is a cylindrical cord from which the spinal nerves extend.
2. Location :	It is located in a bony box called skull.	It extends in a channel within a series of vertebrae in the backbone.
3. Function :	It directs and coordinates all the processes, ideas, behaviours and emotions.	- It delivers the nerve messages from the body organs to the brain and vice versa. - It is responsible for the reflex actions.

2. Compare between cerebellum and medulla oblongata.

Points of comparison	Cerebellum	Medulla oblongata
Location :	It lies at the back area of the brain below the two cerebral hemispheres.	It lies in front of the cerebellum.
Function :	It maintains the balance of the body during the movement.	It is responsible for regulating the involuntary processes of the body as : - Regulating the heartbeats. - Regulating the movement of the respiratory system parts during breathing. - Regulating the movement and functions of the digestive system.

PART 2

3. Compare between the structure of spinal cord and the structure of the two cerebral hemispheres.

Points of comparison	Spinal cord	Cerebral hemispheres
Structure :	It consists of : - Internal gray matter that has the shape of letter "H". - External white matter that surrounds the gray matter.	They consist of : - Internal white matter. - External gray matter that surrounds the white matter.

4. Compare between cranial nerves and spinal nerves.

Points of comparison	Cranial nerves	Spinal nerves
Definition :	They are nerves that emerge from the brain.	They are nerves that emerge from the spinal cord.
Number :	12 pairs.	31 pairs.

5. Compare between the central nervous system and the peripheral nervous system.

Points of comparison	Central nervous system	Peripheral nervous system
Structure :	It consists of the brain and the spinal cord.	It consists of cranial nerves and spinal nerves.
Function :	- It directs and coordinates all the processes, ideas, behaviours and emotions. - It delivers the nerve messages from the body organs to the brain and vice versa. - It is responsible for the reflexes.	It delivers the sensory information and the kinetic responses between the central nervous system and all parts of the body.

6. Compare between different types of joints.

Points of comparison	Immovable joints	Slightly movable joints	Freely movable joints
Definition :	They are the joints that don't allow any movement.	They are the joints that allow movement in one direction only.	They are the joints that allow movement in all directions.
Examples :	Joints between the bones of the skull.	- Knee joint. - Elbow joint.	- Shoulder joint. - Wrist joint. - Thigh (hip) joint.

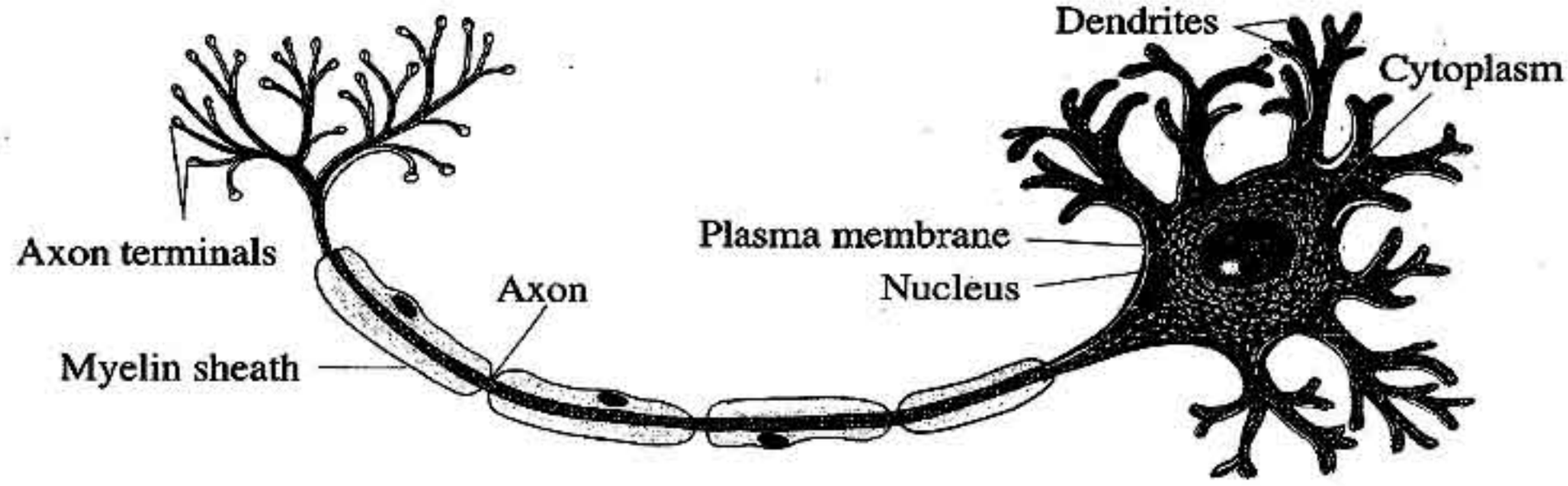
7. Compare between axial skeleton and appendicular skeleton.

Axial Skeleton	Appendicular Skeleton
It is composed of the skull, the backbone and the ribcage.	It is composed of bones of upper limbs and bones of lower limbs.

8. Compare between the upper limbs and the lower limbs in the human being.

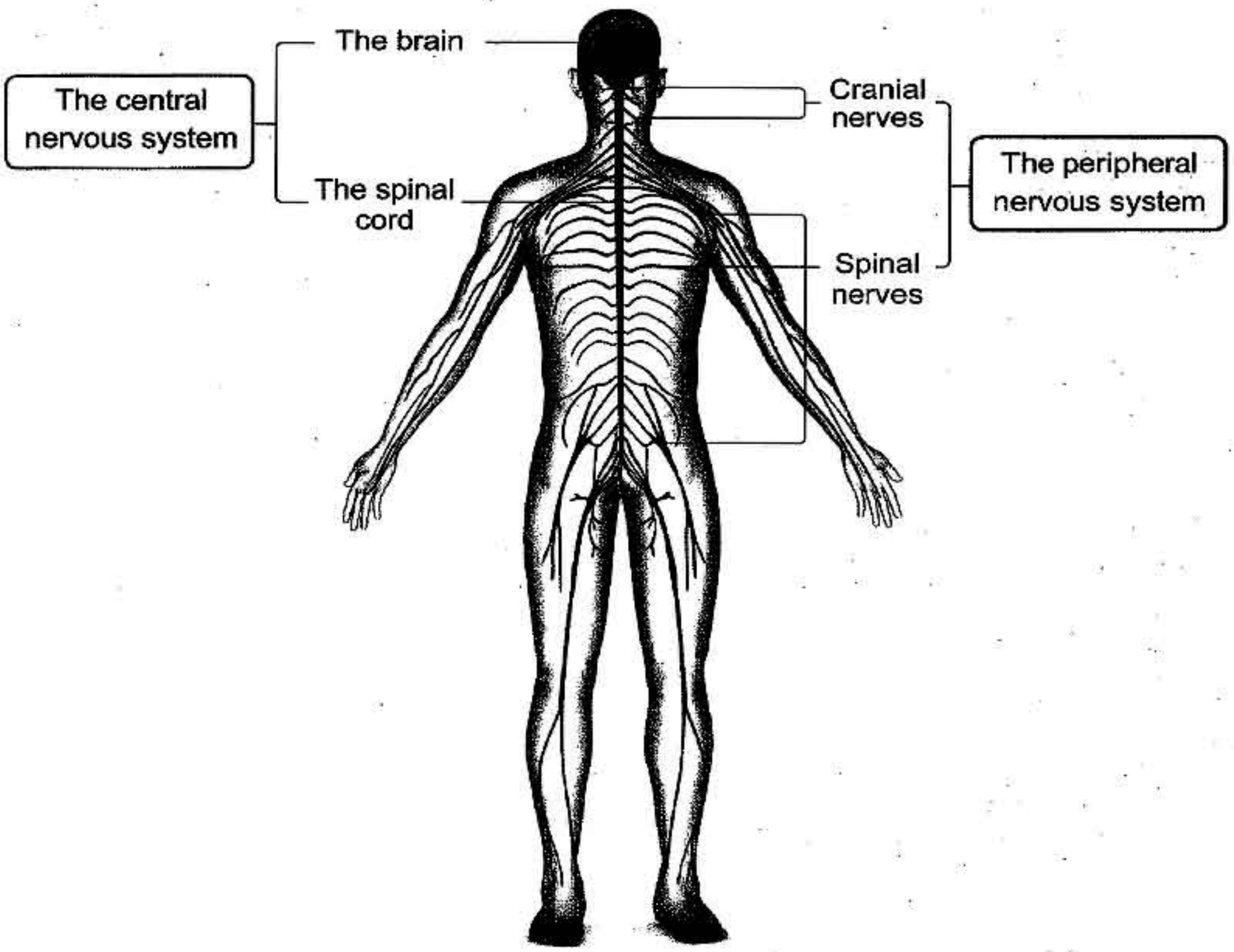
The upper limbs	The lower limbs
– They are connected to the shoulder bones. – They are humerus bone, forearm bones and hand bones. – They allow eating drinking and holding things.	– They are connected to the pelvic bones. – They are femur bone, shaft bones and foot bones. – They allow walking, running and sitting.

Important drawings

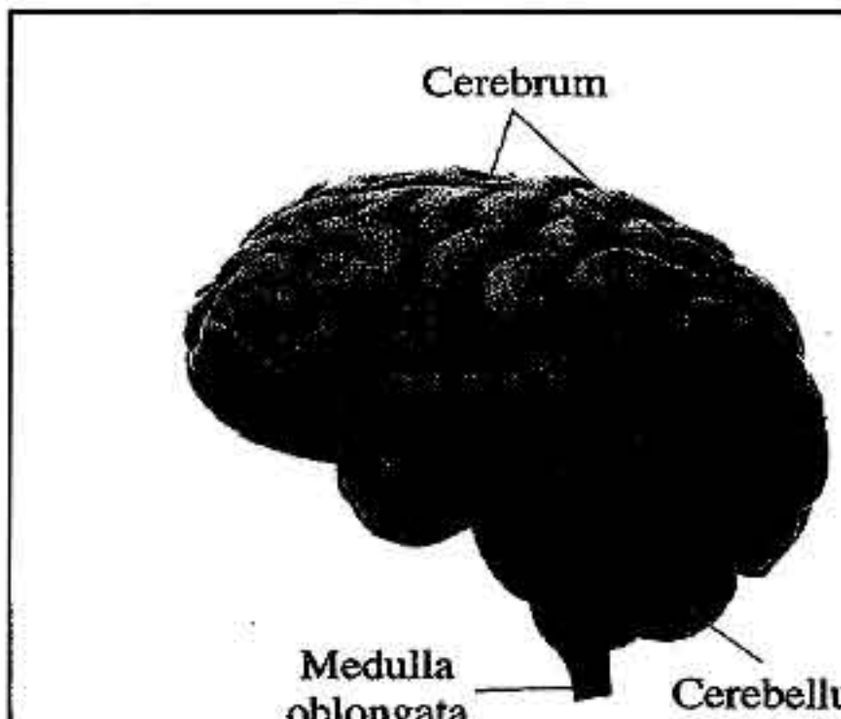


The structure of the nerve cell (neuron)

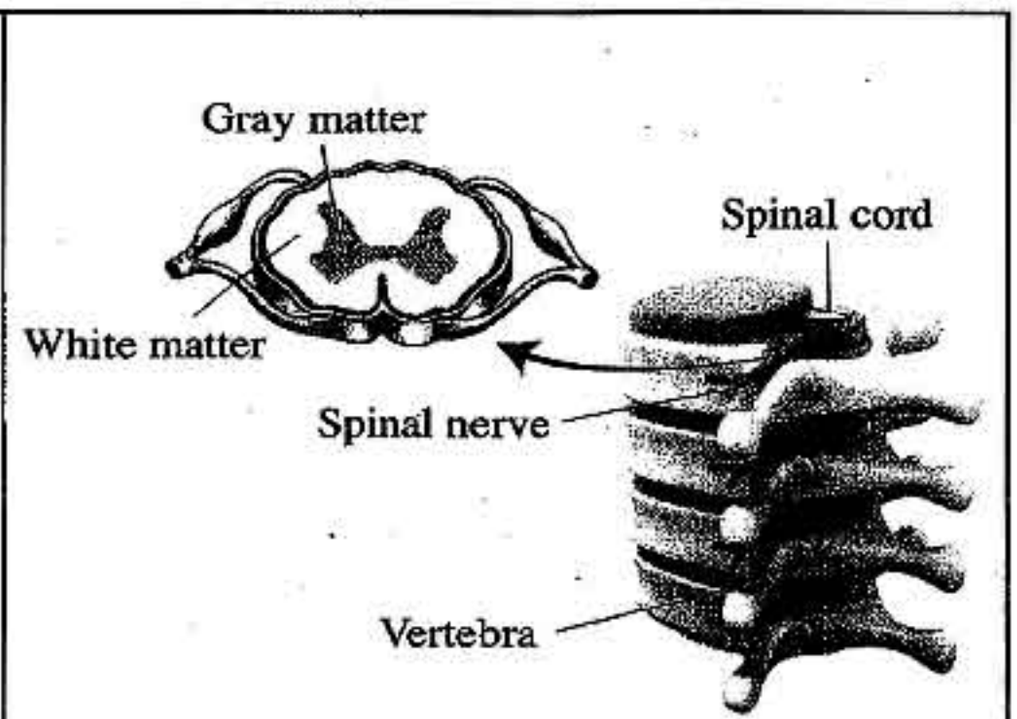
PART 2



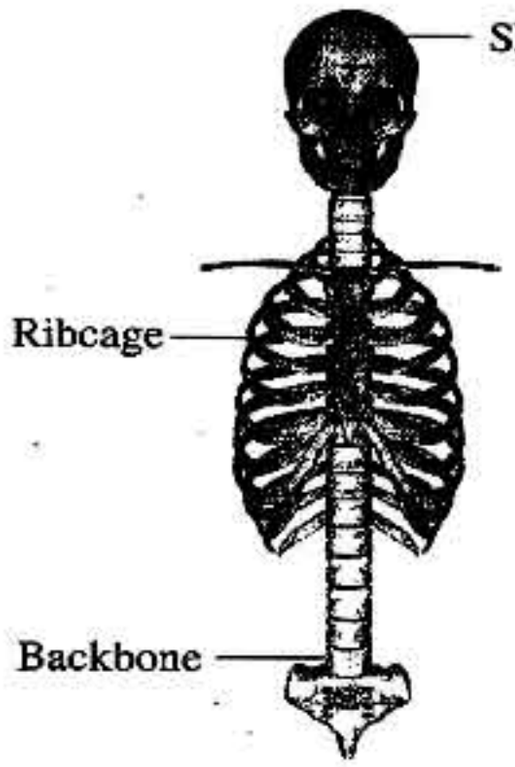
The structure of the nervous system



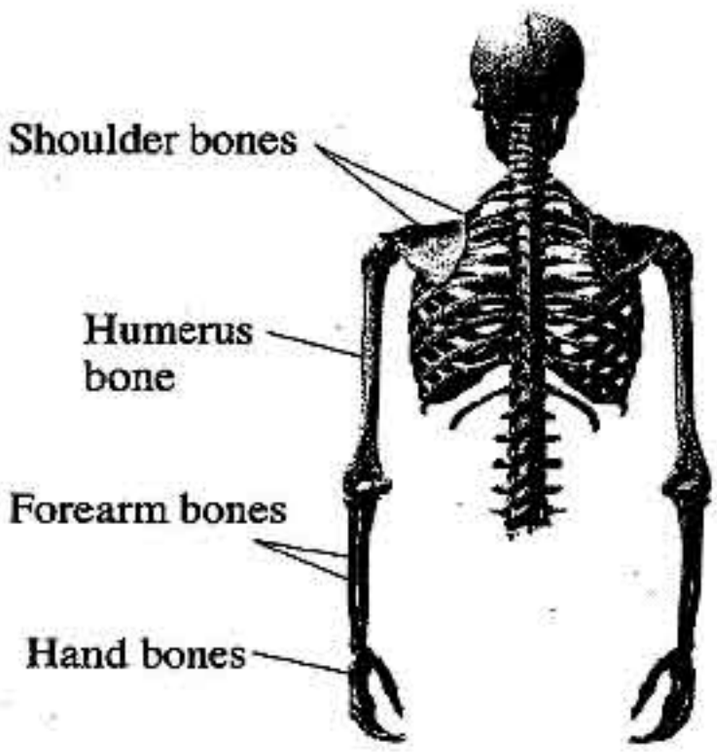
"The structure of the brain"



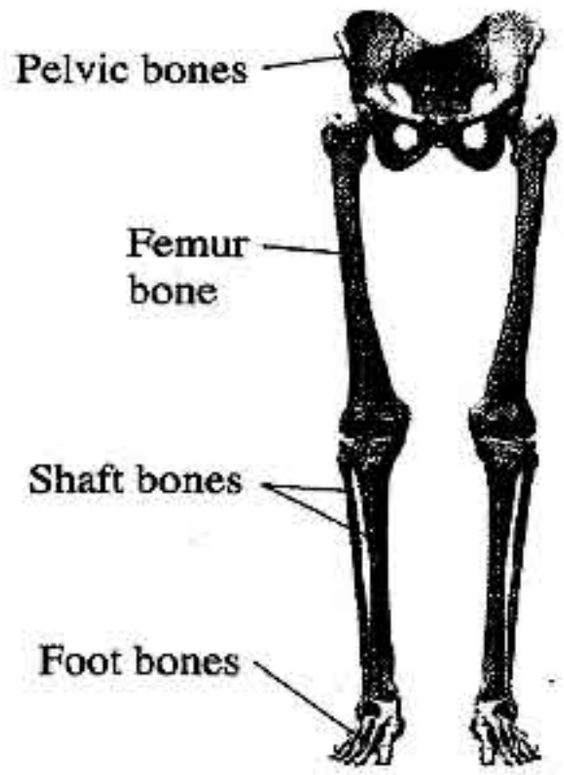
"Spinal cord"



"Axial skeleton"



"Bones of upper limbs"



"Bones of lower limbs"

Important points

- The nervous system consists of two major systems which are :
  1. Central nervous system. ***2. Peripheral nervous system.***
- The neuron consists of two main parts which are :
  1. The cell body. ***2. The axon.***
- The cell body contains **a nucleus**, **cytoplasm** and **a plasma membrane**.
- The brain of the human consists of three main parts which are :
  1. Cerebrum. ***2. Cerebellum.***
  3. Medulla oblongata.

PART 2

- The outer part of the cerebrum is **a gray matter**, but the inner part is **a white matter.**
- The outer part of the spinal cord is **a white matter**, but the inner part is **a gray matter (that has the shape of letter "H")**.
- The structure of the spinal cord is **opposite to** that of the two cerebral hemispheres.

- Ways to maintain the human nervous system :

1. Reducing the intake (drinking) of the stimulating substances such as tea, coffee and others.
2. Staying away from the tranquilizers and stimulants.
3. Keeping away from sitting for long periods in front of computer and television to avoid the exhausting of sense organs.
4. Giving the body a sufficient period of rest especially during sleep.
5. Avoiding the extreme exciting situations.
6. Staying away from the sources of pollution, because they passively affect the nervous system.
7. Doing physical exercises.
8. Staying away from addiction.

- The locomotory system consists of :

1. The skeletal system.
2. The muscular system.

- The skeletal system consists of :

1. The axial skeleton.
2. Appendicular skeleton.

- The backbone consists of **33 vertebrae**.
- The ribcage consists of **12 pairs** of ribs.
- In the ribcage, the first **10 pairs** of ribs are connected to the **sternum** (breast bone) anteriorly.
- Bones of upper limbs are connected to the **shoulder bones**, while the bones of lower limbs are connected to **pelvic bones**.